

East Guyong Quarry Annual Review – 06_0193

1 January 2020 to 31 December 2020



Table 1: Document Control & Title Block

Document Title	Environmental Management Annual Review – East Guyong Quarry			
Document Number	V1			
Document Owner	Hanson Construction Materials Pty Ltd			
Revision	Issue Date	Originator	Reviewed	Approved
Draft		Belinda Pignone	Chris Cooke	Chris Cooke
Final				

Name of operation	East Guyong Quarry
Name of operator	Hanson Construction Materials Pty Ltd
Development consent / project approval #	Project Approval 06_0193
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Annual Review start date	1 January 2020
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1. STATEMENT OF COMPLIANCE

Table 1: Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
PA 06_0193	NO
EPL 20191	NO

Table 2: Non-Compliances

Relevant Approval	Condition #	Condition description (summary)	Compliance status	Comment	Where addressed in Annual Review
PA 06_0193 EPL 20190	Sch 3, Con 20 M2.2	This condition relates to the implementation of an Air Quality Monitoring Program. This condition relates to the implementation of an Air Quality Monitoring Program.	Administrative non-compliance	PM10 exceedance on two dates in January 2020.	6.5, 11.2
PA 06_0193 EPL 20190	Sch 3, Con 20 M2.2	This condition relates to the implementation of an Air Quality Monitoring Program. This condition relates to the implementation of an Air Quality Monitoring Program.	Administrative non-compliance	PM10 concentrations were not monitored in two periods of 2020. This represents a non-compliance with the approved Air Quality Monitoring Program.	6.5, 11.2
PA 06_0193	Sch 5, Con 3	Annual Review to be submitted by 31 March, every year.	Administrative non-compliance	Late submission of Annual Review.	11.2
EPL_20191	M8.1	For each discharge point the licensee must monitor the volume of liquids discharge to water.	Administrative non-compliance	Amount of discharged water not monitored during two discharge events.	11.2

Table 3: Compliance status for Table 2

Risk Level	Colour code	Description
High	Non-Compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-Compliant	Non-compliance with: Potential for serious environmental consequences, but is unlikely to occur, or Potential for moderate environmental consequences, but is likely to occur
Low	Non-Compliant	Non-compliance with: Potential for moderate environmental consequences, but is unlikely to occur, or Potential for low environmental consequences, but is likely to occur
Administrative non-compliance	Non-Compliant	Only applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

2. INTRODUCTION

2.1. SCOPE AND FORMAT

This *Annual Review* has been prepared for the East Guyong Quarry (the Quarry) in accordance with the requirements of *Condition 5(3) of Project Approval PA 06_0193 (PA 06_0193)*. The Quarry is owned and operated by Hanson Construction Materials Pty Ltd (Hanson) and located approximately 22km by road southeast of Orange and 36km west of Bathurst (**Figure 1**). This report documents the works undertaken and environmental performance from 1 January 2019 to 31 December 2019 (the reporting period).

PA 06_0193 was granted by the Land and Environment Court on 21 May 2012 and was modified to permit a revised access route on 24 December 2012. A copy of PA 06_0193 is reproduced as **Appendix 1**. *Condition 5(3) of PA 06_0193* is reproduced below.

“By 31 March 2012, and annually thereafter, the Proponent shall review the environmental performance of the project to the satisfaction of the Director-General. This review must:

(a) describe the works (including rehabilitation) that were carried out in the previous calendar year, and the works that are proposed to be carried out over current calendar year.

(b) include a comprehensive review of the monitoring results and complaints records of the project over the past year, which includes a comparison of these results against:

- the relevant statutory requirements, limits, or performance measures/criteria.*
- the monitoring results of previous years; and*
- the relevant predictions in the EA.*

(c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance.

(d) identify any trends in the monitoring data over the life of the project.

(e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and

(f) describe what measures will be implemented over the next year to improve the environmental performance of the project.”

The information presented within this *Annual Review* has been prepared based on information compiled by Hanson. The report generally follows the format and content requirements identified in the *Annual Review Guideline* dated October 2015.

2.2. THE COMPANY

Hanson Construction Materials Pty Ltd operates over 50 quarries in Australia and supplies aggregates, sand, and premixed concrete materials for the construction industry. The Company also produces precast concrete. The Company is a subsidiary company of Heidelberg Cement which internationally employs approximately 60 000 people at more than 3 000 locations in around 60 countries.

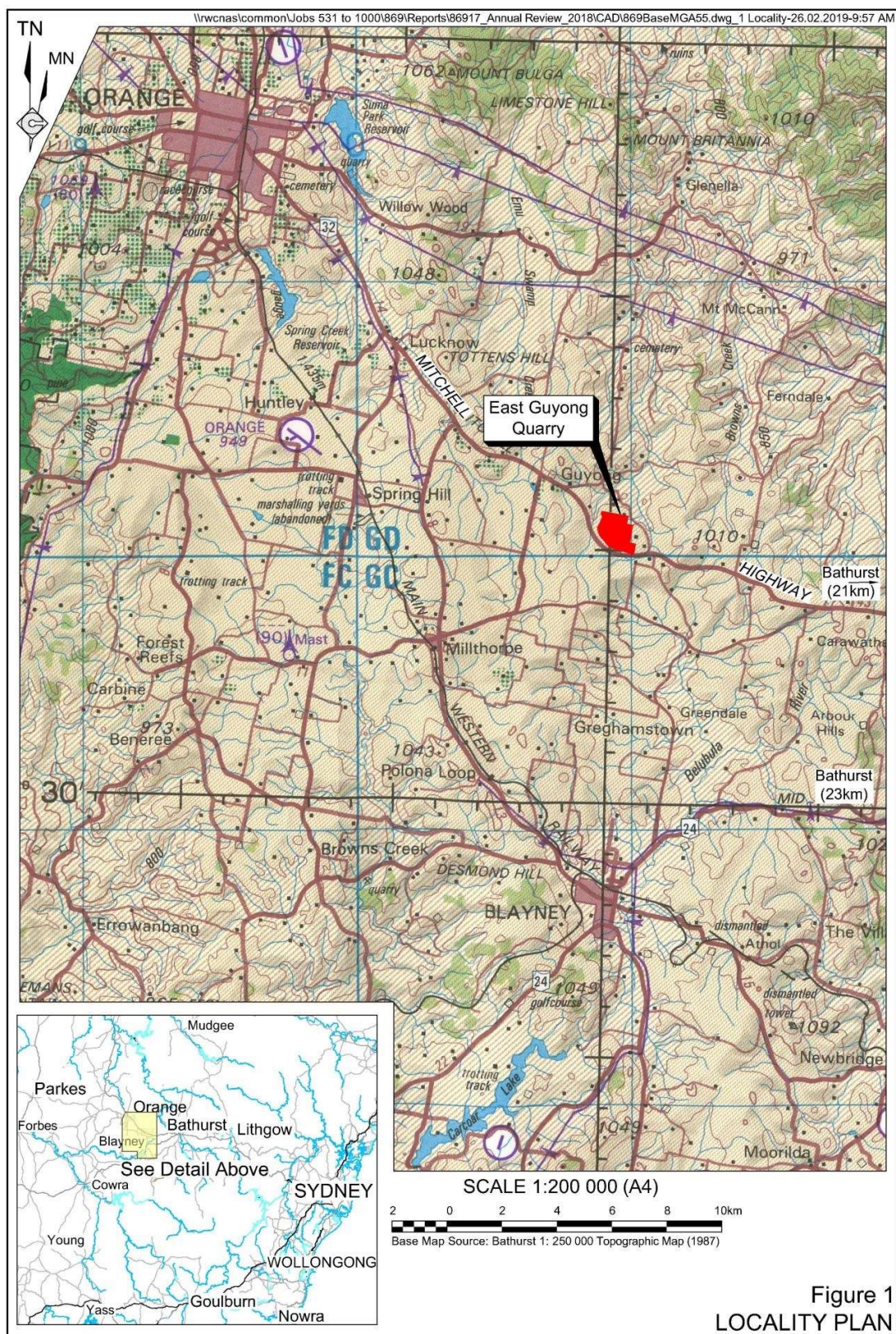


Figure 1: Locality Plan

2.3. OVERVIEW OF OPERATIONS

2.3.1. Approved Activities

The approved activities at the Quarry comprise the following (**Figure 2**).

- Development and use of an extraction area to extract basalt using standard drill, blast, load, and haul techniques.
- Construction and use of a processing plant to process the extracted basalt to produce a range of quarry products, including aggregates and road base, and stockpiling of the resulting products within an identified Infrastructure Area.
- Construction and use of a site access road and intersection with the Mitchell Highway.
- Transportation of up to 600 000t per year of quarry products via the Mitchell Highway using truck and dog and B-Double trucks.
- Construction of a range of bunds and mounds and establishment of native vegetation to provide visual screening for the quarry operations.

2.3.2. Hours of Operation

The approved hours of operation are as follows.

- Monday to Friday (non-daylight savings) – 6:00am to 6:00pm.
- Monday to Friday (daylight savings) – 6:00am to 8:00pm.
- Saturdays – 7:00am to 1:00pm.
- Sundays and public holidays – nil.

Condition 6 of Schedule 3 in PA06_0193 permits transportation activities between 5:00am and 10:00pm Monday to Saturday following negotiation and provision of written agreements with seven nominated surrounding landholders. Such an agreement has been reached and was approved by the Secretary on 10 September 2015. A copy of this approval is provided as **Appendix 2**.

All activities during the reporting Period were undertaken within the approved hours of operation.

2.3.3. Employment

During the reporting period, employment at the Quarry remained at 22 full-time operational staff, including 7 staff involved in extraction and processing activities and 14 staff involved in transportation activities. Employment is expected to remain consistent with this level during the next reporting period.

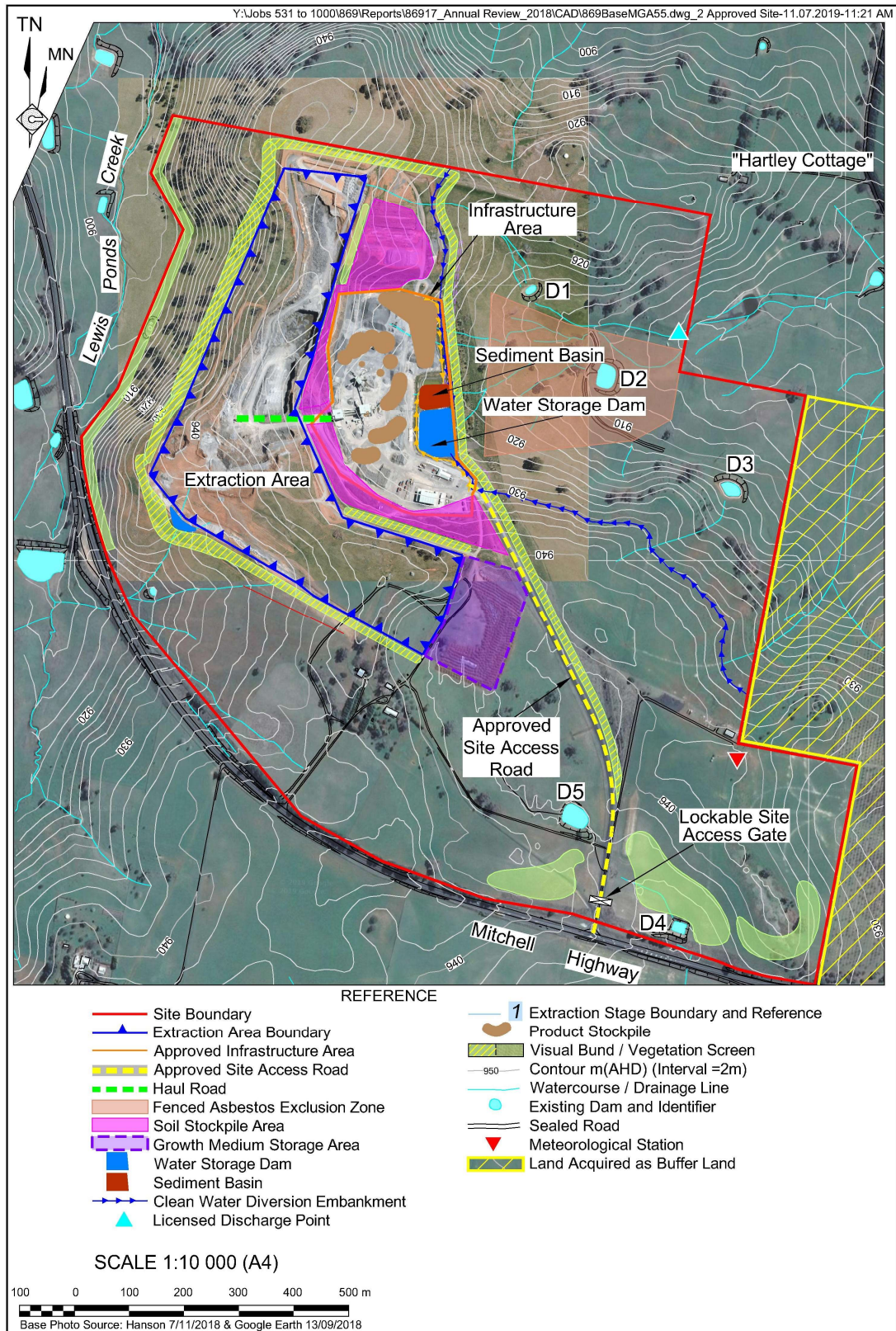


Figure 2: Site Layout

2.4. KEY PERSONNEL CONTACT DETAILS

The key personnel contact names, position and phone numbers are as follows.

<i>Name</i>	<i>Position</i>	<i>24 Hour Contact</i>
Chris Cooke	Quarry Manager	0409 907 043

2.5. MANAGEMENT OF DOCUMENT PREPARATION

This document has been prepared by Ms Belinda Pignone (B.Env.Mgt.Sc.), with assistance from Mr Chris Cooke, Quarry Manager. Hanson provided technical input and information on Quarry operations and environmental performance during the reporting period.

3. APPROVALS

Table 4 presents the approvals and licences held in relation to the Quarry.

Table 4: Approvals and Licences

Consent/Lease/Licence	Issue Date	Expiry Date	Details/Comments
<i>Project Approval PA 06_0193</i>	21/5/2012 Modified 24/12/2012 Modified 17/04/2019	21/12/2042	Issued by the Department of Planning, Industry and Environment
<i>Environment Protection Licence EPL 20190</i>	13/11/2012 Variation 6/01/2014 Variation 3/11/2015	-	Issued by the Environment Protection Authority
<i>Groundwater Access Licence 80AL722920</i>	10/03/2014	-	Issued by the Department of Primary Industries – Office of Water Share component 40ML

On 15 September 2015, the Company received approval from the Department of Planning, Industry and Environment (DPIE) to extend transportation operating hours in accordance with *note (a) of Condition 6(3) within PA06_0193* and following the negotiation of written agreements with the owners of the following privately-owned residences (**Figure 4**).

- “Fairview”
- “Lilactime”
- “Cadora Vale”
- “Cadora”
- “Hartley Cottage”
- “Quinton”
- “Wheatfields”

As a result, transportation operating hours are now permitted between 5:00am and 10:00pm Monday to Saturday. The approval correspondence is included as **Appendix 2**.

On 3 November 2015, the Company received approval for a variation to *Environmental Protection Licence (EPL) 20190* to permit the receipt, storage and processing of waste concrete from regional concrete batching plants for use as a blend material in final products and to vary noise limits in accordance with approval of extended transportation operating hours (see *Condition L4.6 of EPL20190*).

On 17 April 2019, Hanson received approval for a second modification to *PA 06_0193* to permit an extension of the approved Extraction Area and to modify the annual production limit. **Table 5** presents the documentation used by Quarry management to guide day-to-day operations at the Quarry.

Table 5: Quarry Documentation

Document Title	Date Finalised / Approved
<i>Supporting Documentation for Project Approval</i>	
Environmental Assessment	21/05/2012
Environmental Assessment Modification 1	24/12/2012
Environmental Assessment Modification 2	17/04/2019
<i>Environmental Management Plans</i>	
Asbestos Management Plan	05/02/2020
Soil and Water Management Plan	05/02/2020
Transport Management Plan	05/02/2020
Noise Management Plan	12/04/2021 (re-submitted)
Air Quality Monitoring Program	17/07/2019 (submitted)
Blast Management Plan	17/07/2019 (submitted)
Landscape Management Plan	01/06/2020
Aboriginal Cultural Heritage Management Plan	16/11/2020
Environmental Management Strategy	17/07/2019 (submitted)
Crisis Management Plan	Not required
Emergency Management Plan	Not required
Pollution Incident Response Plan	Not required

It should be noted that all management plans are regularly reviewed in accordance with *Condition 4 of Schedule 5 of PA 06_0193*. All management plans were reviewed and updated on approval of Modification 2 to *PA 06_0193* with most management plans submitted to DPIE for approval in 2019.

Management plans will be reviewed in the second quarter of the 2021 reporting period.

4. OPERATIONS SUMMARY

4.1. INTRODUCTION

Figure 2 presents an overview of the Quarry layout at the end of the current reporting period.

4.2. EXTRACTION OPERATIONS

Table 6 presents the material movements during the previous and current reporting periods and the anticipated movements during the next reporting period.

Table 6: Production Summary – tonnes

Material	Approved limit (specify source)	Previous reporting period (actual)	This reporting period (actual)	Next reporting period (forecast)
<i>Topsoil inventory (cumulative)</i>	None	5,000	0	0
<i>Overburden moved</i>	None	60,000	60,000	80,000
<i>Raw feed extracted</i>	None	335,000	287,919	335,000
<i>Product transported off site</i>	600,000 (PA 06_0193 Condition 2(6))	340,000	287,919	335,000
Source: Hanson Construction Materials Pty Ltd				

Overburden stripped in preparation for blasting and extraction activities was used to construct the amenity bunds within the property boundary including those to the south and to the north of the Extraction Area.

A total of 21 blasts were initiated during the reporting period. **Table 7** presents relevant information in relation to each blast. All blasts were production blasts and occurred within the approved extraction area (see **Figure 2**).

The Company has continued to refine blasting and blast monitoring procedures throughout the reporting period through the following measures.

- Review of each of the four blast monitors and results by Hanson and the blast contractor technical staff following each blast event.
- Applying any proposed modifications to blast design in single steps to evaluate the impact of each modification independently.
- Modification of the blasting pattern following review of previous blast results to reduce powder factors.

Table 7: Blasting Operations during the Reporting Period

Blast Number	Blast Time	Date Initiated	Volume of Blast (bcm)
<i>Blast 20_03</i>	12:00pm – 1:00pm	22 January 2020	17911
<i>Blast 20_01</i>	12:00pm – 1:00pm	20 February 2020	16958
<i>Blast 20_02</i>	12:00pm – 1:00pm	16 April 2020	16221
<i>Blast 20_04</i>	12:00pm – 1:00pm	9 June 2020	2
<i>Blast 20_05</i>	12:00pm – 1:00pm	4 June 2020	12722
<i>Blast 20_06</i>	12:00pm – 1:00pm	19 June 2020	13497
<i>Blast 20_07</i>	12:00pm – 1:00pm	19 June 2020	2
<i>Blast 20_08</i>	12:00pm – 1:00pm	23 July 2020	11560
<i>Blast 20_09</i>	12:00pm – 1:00pm	13 August 2020	14781
<i>Blast 20_10</i>	12:00pm – 1:00pm	13 August 2020	2
<i>Blast 20_11</i>	12:00pm – 1:00pm	22 September 2020	16258
<i>Blast 20_13</i>	12:00pm – 1:00pm	29 October 2020	14343
<i>Blast 20_14</i>	12:00pm – 1:00pm	17 November 2020	13472
<i>Blast 20_12</i>	12:00pm – 1:00pm	10 December 2020	13370
<i>Blast 20_16</i>	12:00pm – 1:00pm	10 December 2020	2
<i>Blast 20_17</i>	12:00pm – 1:00pm	11 December 2020	2
<i>Blast 20_18</i>	12:00pm – 1:00pm	11 December 2020	2
<i>Blast 20_15</i>	12:00pm – 1:00pm	17 December 2020	2
<i>Blast 20_19</i>	12:00pm – 1:00pm	17 December 2020	13995
<i>Blast 20_20</i>	12:00pm – 1:00pm	18 December 2020	2
<i>Blast 20_21</i>	12:00pm – 1:00pm	18 December 2020	2

4.3. OTHER OPERATIONS

4.3.1. Construction Operations

During the reporting period, progressive construction of amenity bunds continued, principally those to the south and to the north of the extraction area. Infrastructure works during the current reporting period included the construction of the southern amenity bund and the site nursery facility were completed during the reporting period.

Processing operations required use of the Fixed Processing Plant and Pre-coat Plant during the reporting period (see **Figure 2**).

During the previous reporting period, a system for additional dust suppression that applies Polo Citrus dust suppression products was installed at the feeder for the cone crusher and prior to material entering the screening plant. The suppressant is combined with water to create a foam that suppresses dust dispersion from the processing plant. The use of Polo Citrus dust suppressant was continued during the current reporting period.

4.3.2. Product Transportation

Product transported off site during the reporting period was approximately 287,919 tonnes of material, which is below the approved annual transportation volume of 600 000 tonnes.

A conditioning stand was constructed within the Approved Infrastructure Area in 2018. Prior to exiting the Project Site, trucks loaded with product pass under the conditioning stand which applies water to the product load for dust suppression purposes.

4.4. NEXT REPORTING PERIOD

Blasting for extraction operations are expected to continue during the next reporting period, with further blasts undertaken once or twice a month subject to market and internal demand from the Company's other operations. The Company anticipates that production will remain consistent with that achieved in 2019 (see **Table 3**).

Construction of the amenity bund to the north and northeast of the extraction area will continue during the next reporting period.

Processing activities using the Fixed Processing Plant and Pre-coat Plant are proposed to continue during the next reporting period, with the amount of material to be processed dependant on the demand for the Quarry's products from internal and external customers.

Product transport during the next reporting period will depend on client demand over the year but is not expected to exceed the approved transport volume.

Rehabilitation activities during the next reporting period will extend to the progressive shaping and revegetation of the western visual amenity screen.

5. ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

Correspondence from the Department of Planning, Industry and Environment regarding the Annual Review 2019 was provided on 10 June 2020. No further action was required apart from a copy of the revised Annual Review to be uploaded to the website.

6. ENVIRONMENTAL PERFORMANCE

6.1. INTRODUCTION

Environmental monitoring is undertaken to determine the degree of impact the construction and production operations are having on the environment. Assessment of these results can establish if environmental management systems are being successfully applied in the short term and if the management systems need to be amended.

Appropriate environmental monitoring, apart from satisfying necessary statutory requirements, demonstrates to the local community and relevant authorities the Company's commitment to the protection of the environment.

The following sub-sections present the results of the various monitoring programs undertaken throughout the reporting period. Where appropriate, results of the previous years' monitoring are also presented for comparative purposes.

Figures 3 and 4 provide monitoring locations and residences referred to in this section.

A program of regular aerial photography commenced in late 2013, with further flights planned annually. Aerial photograph captured on 7 November 2018 has been used in the preparation of **Figures 2 to 4**.

6.2. METEOROLOGICAL MONITORING

Table 9 presents the meteorological monitoring results recorded by the Company's automated meteorological monitoring station. In addition, long term-average climate data from the Bureau of Meteorology-operated Orange Airport AWS (Station No 063303) is provided for comparison.

The site weather station (Carbon Based Environmental) replaced a faulty sensor in the second quarter of 2019, however, the automated meteorological monitoring station encounter issues where readings were not consistently available for small periods of time throughout the reporting period. Quarry staff contacted Carbon Based Environmental as soon as the issue was observed and were advised to manually reset the weather station. The weather station was manually reset each time monitoring data was observed to be irregular throughout 2019.

Temperature readings at 2m above ground level have been reported where data for an entire monthly period is available. Maximum temperature records at the Quarry for those months during the reporting period with complete datasets were significantly higher compared to the long-term temperature records whilst minimum temperatures were lower than average, suggesting highly variable average daily temperatures throughout the year.

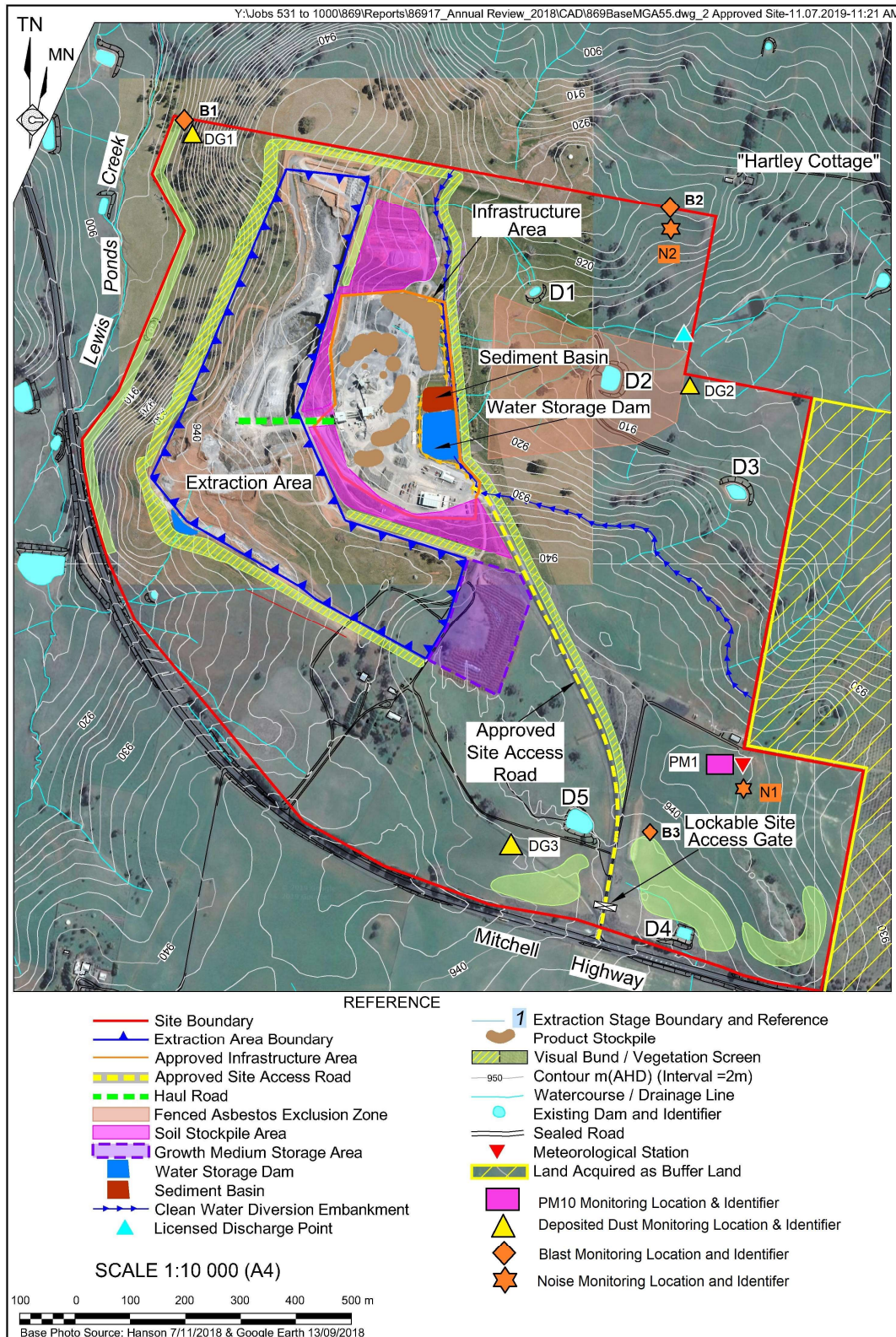


Figure 3: Environmental Monitoring Locations

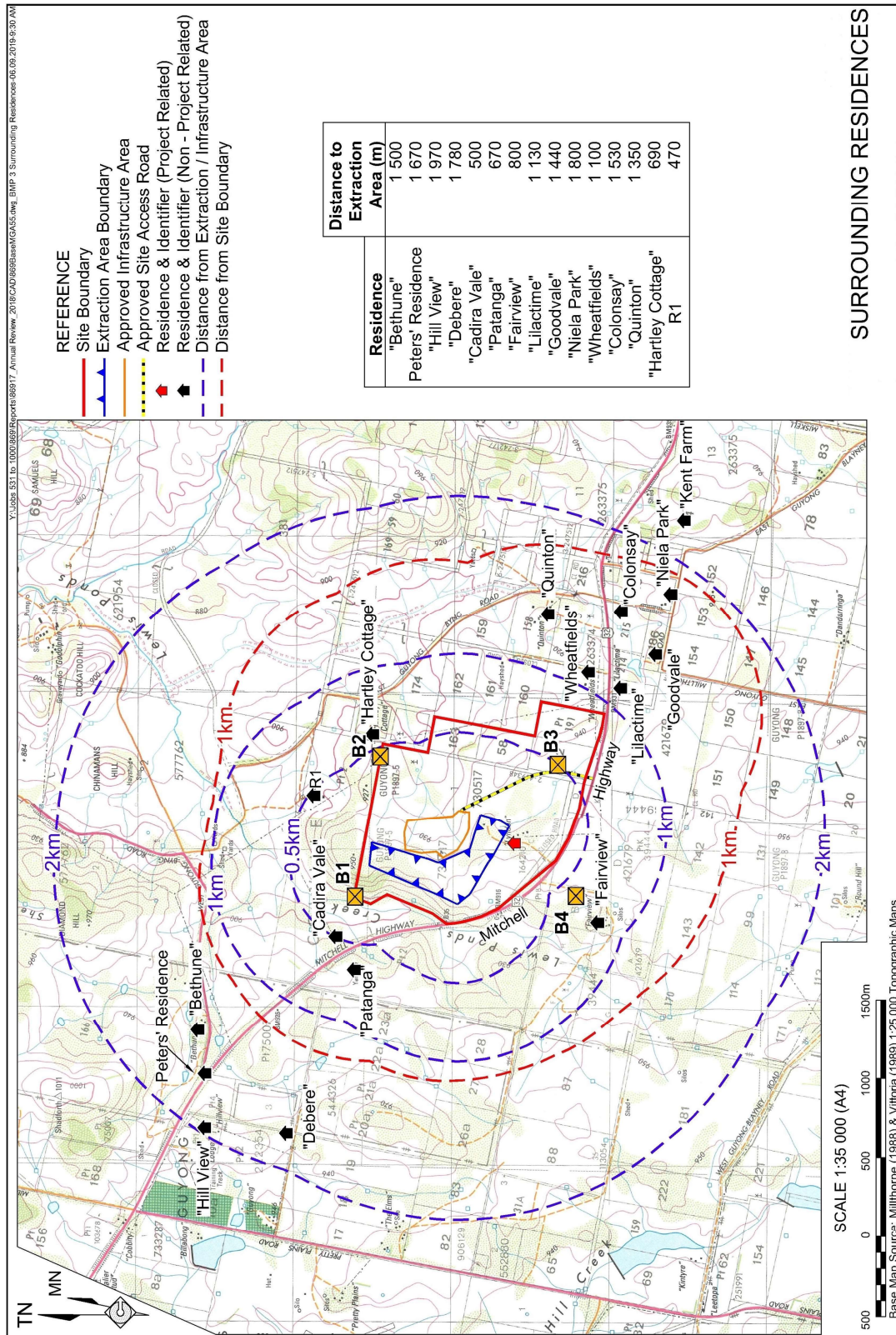


Figure 4: Surrounding Residences

Table 9: Meteorological Monitoring Results

Year		Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Average Temperature (°C)														
2014	Max	28.8	N/A	N/A	17.7	14.1	10.3	9.1	11.2	14.4	20.2	25.7	25.6	-
	Min	13.5	N/A	N/A	8.1	5.0	2.9	1.1	0.9	3.9	6.6	9.8	12.0	-
2015	Max	30.1	31.2	29.8	24.6	19.0	14.3	N/A	N/A	N/A	N/A	N/A	N/A	-
	Min	6.6	9.9	1.8	1.2	-1.1	-3.1	-4.8	-3.2	-0.6	4.3	2.6	7.0	1.7
2016	Max	34.2	33.1	31.1	26.5	21.5	13.3	15.4	15.3	16.7	21.6	25.1	30.5	23.7
	Min	8.5	8.4	5.9	6.7	-2.2	-3.4	-1.1	-1.7	1.8	1.8	1.6	8.9	2.9
2017	Max	28.6	28.1	22.6	17.2	13.5	11.2	10.3	10.5	14.9	19.6	21.2	25.0	18.6
	Min	21.7	26.3	13.6	7.8	4.8	2.5	2.0	2.2	4.7	8.3	9.8	14.2	9.8
2018	Max	N/A	N/A	31.7	28.0	20.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-
	Min	N/A	N/A	1.3	3.7	-0.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-
2019	Max	37.4	26.1	29.4	N/A	20.1	16.0	14.9	17.8	21.6	28.3	32.3	37.2	-
	Min	13.1	13.9	6.0	N/A	-0.5	-2.9	-1	-1.4	-0.2	-0.1	1.7	4.9	-
2020	Max	37.4	36.6	29.8	21.6	17.3	14.5	13.6	16.8	20.9	23.2	32.1	34.4	3.2
	Min	12.3	8	7.3	1.9	-1	0.4	-2.7	-1.6	0.1	3.4	5.2	4.9	24.9
Long Term Average ¹	Max	26.0	25.2	22.4	18.3	13.9	10.4	9.3	10.7	13.7	20.5	20.5	23.9	17.6
	Min	12.2	12.4	9.7	6.2	3.5	1.5	0.7	1.4	5.8	7.9	7.9	10.1	6.2
Rainfall (mm)														
2014	Total	17.4	-	-	50.0	40.6	108.2	56.6	42.0	37.4	58.8	33.8	77.8	-
	No. of Rain Days	6	-	-	10	18	21	20	13	6	5	6	12	-
	Max Daily Rainfall	15.4	-	-	17.0	20.8	27.2	18.4	16.6	18.6	38.4	12.2	29.8	-
2015	Total	59.2	54.6	25.8	151.0	48.6	34.6	84.4	76.6	16.0	30.0	88.0	68.0	736.8
	No. of Rain Days	6	7	4	18	14	19	19	15	8	6	10	7	133
	Max Daily Rainfall	26.6	26.4	12.0	25.2	30.8	13.0	13.8	18.2	7.4	11.8	25.0	37.6	37.6
2016	Total	111.4	0.2	52.8	35.8	66.0	154.6	93.8	95.2	194.2	63.6	46.8	72.6	988.0
	No. of Rain Days	11	1	9	6	10	23	15	14	19	15	9	11	143
	Max Daily Rainfall	20.2	0.2	21.2	20.4	27.6	30	39.4	35.6	48.6	15.2	31.4	52.6	52.6
2017	Total	45.8	15.0	119.2	23.2	36.6	5.0	20.4	43.6	18.4	55.4	86.4	105.2	574.2
	No. of Rain Days	8	4	10	6	13	15	10	9	6	6	9	11	107
	Max Daily Rainfall	35.4	10.6	42.6	11.0	12.4	1.4	13.6	19.2	10.6	27.6	32.8	44.4	44.4
2018	Total	31.6	26.4	18.6	11.6	28.8	32.2	14.8	54.0	37.8	38.0	116.0	56.4	466.2
	No. of Rain Days	11	4	3	7	8	13	10	9	6	7	13	6	97
	Max Daily Rainfall	17.6	13.6	15.0	4.4	10.2	6.8	4.6	15.0	17.0	17.4	46.0	20.2	46.0
2019	Total	90.2	0.2	1.2	0.2	13.8	34	16.8	17.4	45	19.8	19.6	10.6	268.8
	No. of Rain Days	13	1	5	1	9	14	10	8	7	9	8	2	87
	Max Daily Rainfall	24	0.2	0.4	0.2	4.2	12	6.4	4.8	22.6	6	11.6	10	22.6
2020	Total	73	59.2	0	64.8	46.8	52.6	68.8	87.6	47	80.6	46.2	59.4	686.0
	No. of Rain Days	9	6	0	7	15	20	15	20	15	14	10	10	141
	Max Daily Rainfall	38.2	30.4	0	40.8	20.2	16.2	25.8	18.6	21.4	25.6	21.8	14.8	40.8
Long Term Average ¹	Total	84.0	82.4	53.7	52.6	62.5	65.3	88.2	93.6	79.0	78.2	76.0	78.8	897.6
	No. of Rain Days	8.7	8.2	7.2	7.2	10.0	12.3	13.6	13.5	11.6	10.8	10.3	9.0	122.4
	Max Daily Rainfall	116.2	92.0	49.5	68.2	64.4	46.0	56.4	66.0	53.3	68.6	74.8	83.0	116.2
Note 1: Long-term average data source – Orange Airport AWN (Station No 063303) – Updated 31 March 2021														
Note 2: N/A – Data not available or incomplete														
Source: Hanson Construction Materials Pty Ltd														

Rainfall variability can be considered through comparison of annual and individual month records at the Quarry with those recorded during 2019. In summary, total rainfall during 2020 was significantly higher than that in 2019, however individual months varied. When compared with the long-term average recorded at the Orange Airport AWS, there is significant variance across the year.

Wind rose data (9:00am and 3:00pm) recorded at the Orange Airport meteorological station (Station No. 063303) is provided in **Figure 5**.

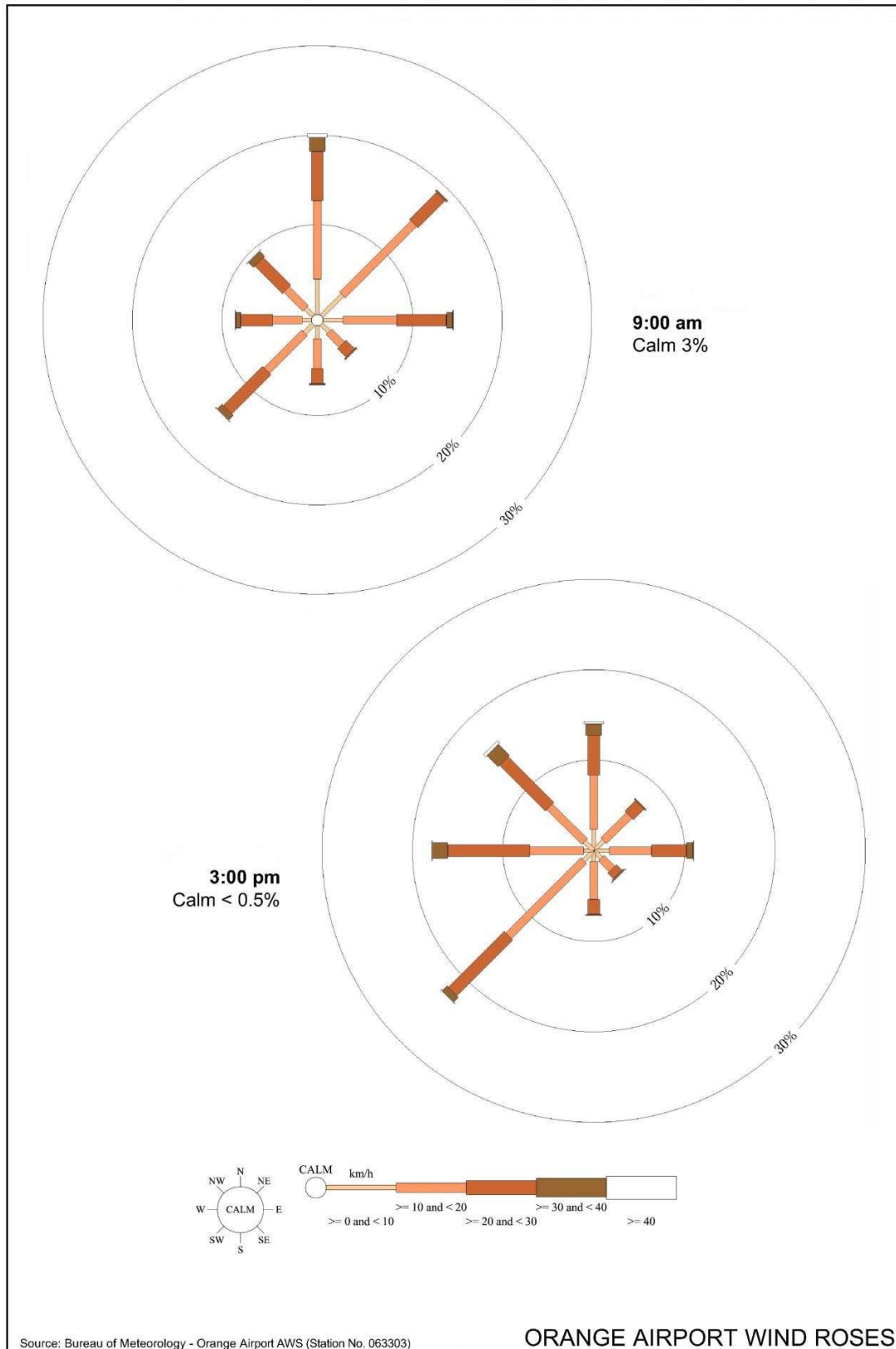


Figure 5: Wind rose data (Orange Airport)

6.3. ASBESTOS

6.3.1. Predicted Impacts and Performance Criteria

The Asbestos Management Plan prepared by RiskTech and dated September 2019 was approved by the Department of Planning, Industry and Environment 5 February 2020. That document identifies the control measures to be implemented by the Company, as well as documenting the Asbestos Fibre Air Monitoring Protocol, Notification Protocol and Exceedance Protocol and measures to be implemented in the event of exposure to Naturally Occurring Asbestos.

In summary, Section 6 of the Asbestos Management Plan require the following stages of asbestos monitoring.

1. Background monitoring at a range of locations for a minimum of five days prior to commencement of intrusive works.
2. Daily control and personal monitoring during intrusive works.
3. Weekly control and personal monitoring for a three-month period following the conclusion of intrusive works.
4. Monthly control and personal monitoring for the period of between 4 and 15 months following the conclusion of intrusive works.
5. Bi-monthly control and personal monitoring for the period from 16 months following the conclusion of intrusive works during the life of the Quarry.

Intrusive Works are defined as “any works for site infrastructure that have the potential to disturb soil or rock on the Infrastructure Area.”

Stage 1 was completed during the 2012/2013 reporting period. All “intrusive works” ceased with the completion of the Fixed Processing Plant in September 2014. As a result, the Company transitioned from Stage 3 to Stage 4 monitoring in January 2015. In April 2017 the Company was due to transition to bi-monthly monitoring consistent with Stage 5 of the monitoring program, however the Company had continued to monitor monthly until the update to the Asbestos Management Plan. The updated Asbestos Management Plan was approved by DPIE 5 February 2020, which details monitoring to be completed on a quarterly basis for the duration of the operation of the Quarry, except with the agreement of the Secretary.

6.3.2. Monitoring Procedure and Criteria

Monitoring of airborne asbestos fibres is undertaken using a small pump that draws a known volume of air through a filter. The filter collects dust particles in the air. The filters are sent to Greencap/NAA Limited (formerly Noel Arnold and Associates Pty Ltd) on the day they are collected for analysis and reporting in accordance with the Asbestos Management Plan.

In implementing monitoring requirements of the Asbestos Management Plan, the Applicant undertakes asbestos sampling on days when rain is not falling, and potential exists for airborne dust to be generated.

Fibre concentrations are analysed by Greencap/NAA Limited (formerly Noel Arnold and Associates Pty Ltd), a NATA-accredited laboratory, using phase contrast microscopy in accordance with the procedure identified in the Asbestos Management Plan.

All fibres are counted initially, with those samples exceeding the Quantification Limit of 0.01 fibres/mL further analysed, to determine whether the fibres are asbestiform or non-asbestiform. In accordance the Asbestos Management Plan this assessment would be undertaken by an approved external laboratory using scanning electron microscopy or transmission electron microscopy.

The Asbestos Impact Assessment Criterion (AIAC) is 0.01 asbestos fibres/mL.

Table 7 presents a summary of the asbestos performance criteria and actions to be implemented in the event of an exceedance of the criteria.

Table 7: Asbestos Monitoring Performance Criteria

Criteria	Limit	Action in the Event of Exceedance
Quantification Limit	0.01 fibres/mL	Cease intrusive works and isolate and secure the work area. Employ dust suppression techniques. Notify relevant stakeholders. Send samples for further analysis by an approved laboratory. If no exceedance of AIAC resume works.
Asbestos Impact Assessment Criterion	0.01 asbestos fibres/mL	Implement a 25m exclusion zone around the monitoring location. Engage NATA accredited asbestos consultant or licensed asbestos assessor to assist in the investigation and provide appropriate advice. Notify relevant stakeholders. Implement recommended measures prior to resuming work.
Source: Asbestos Management Plan		

6.3.3. Measured Performance

In accordance with *Condition 5(10)(a) of PA06_0193*, all asbestos monitoring certificates are presented on the Quarry's website and provided as **Appendix 3**. In summary, samples were taken on the following days.

- 02 March 2020
- 11 June 2020
- 23 September 2020
- 14 December 2020

The Company analysed a total of 28 samples over these dates at locations within the Infrastructure Area and at strategic locations within the Quarry Site to accurately determine background conditions.

No samples exceeded the Quantification Limit during the reporting period and as a result, no samples required further testing to determine whether the Asbestos Impact Assessment Criterion has been exceeded.

6.3.4. Discussion and Analysis

Monitoring throughout the reporting period was undertaken in accordance with the approved Asbestos Management Plan. No monitoring samples have exceeded the quantification or screening limit for airborne asbestos fibres since monitoring commenced in July 2012.

No samples taken during the reporting period exceeded the quantification or screening limit for airborne asbestos fibres. As a result, the Company contends that the management measures implemented to date would appear to have been effective in protecting the health of the Company's employees and contractors, as well as the health of the surrounding community. The Company will continue to implement the identified management measures and monitoring procedures during the next and subsequent reporting periods.

6.4. NOISE

6.4.1. Predicted Impacts and Performance Criteria

Table 8 identifies the predicted operating noise levels at four representative residences surrounding the Quarry (**Figure 4**) and **Table 9** identifies the relevant noise-related performance criteria for residences surrounding the Quarry Site identified by *Condition 3* of *Schedule 5* of *PA 06_0193*.

The Noise Management Plan identifies that noise monitoring would be undertaken at two intermediate locations, namely Locations N1 and N2 (**Figure 3**), within land owned by the Company as a screening mechanism and to ensure that residents of the surrounding properties are not unduly inconvenienced as a result of the attended monitoring program. In 2012, Mr Dick Godson of SLR undertook an assessment of equivalent noise levels at Locations N1 and N2 for preparation of the Noise Management Plan for the Quarry (RWC, 2013) that would ensure compliance with the noise criteria identified in *Condition 3(5)* of *PA06_0193*. **Table 10** also presents the results of that assessment as the noise level criteria to be applied at these locations.

Table 8: Predicted Operating Noise Levels

Receiver ¹	Stage	Daytime (0700 – 1800)		Evening (1800 – 2200)		Night-time (2200 – 0700) calm	
		Predicted L _{Aeq} (15 minute) noise level	Predicted L _{Aeq} (15 minute) intrusive criterion	Predicted L _{Aeq} (15 minute) noise level	Predicted L _{Aeq} (15 minute) intrusive criterion	Predicted L _{Aeq} (15 minute) noise level	Predicted L _{Aeq} (15 minute) intrusive criterion
“Cadira Vale”	1	22	35	20	35	20	35
	4	29		21		21	
	7	28		23		23	
“Fairview”	1	25	36	22	35	23	35
	4	36		22		22	
	7	31		25		25	
“Lilactime”	1	23	35	22	35	22	35
	4	20		19		19	
	7	22		20		20	
“Hartley Cottage”	1	29	35	29	35	29	35
	4	32		27		27	
	7	28		27		27	
Note 1: See Figure 4							
Source: Heggies (2007a) – Modified after Table 11							

Table 9: Noise-related Performance Criteria

Location	Day dB(A) ¹	Evening dB(A) ¹	Night dB(A) ¹
Surrounding Residences ²			
"Hartley Cottage"	35	35	35
"Cadira Vale"	35	35	35
"Lilac Time"	35	35	35
"Fairview"	36	35	35
All other privately owned land	35	35	35
Intermediate Monitoring Locations ³			
Location N1	43	43	43
Location N2	510	50	50
Note 1: Units = LAeq 15 minutes			
Note 2: See Figure 4			
Note 3: See Figure 3			

The Company undertakes monitoring quarterly at Locations N1 and N2. In the event that the noise levels identified in **Table 9** are exceeded, there is a substantiated noise-related complaint, or a landholder exercises their rights under *Condition 4(3) of PA 06_0193* to request an independent review of noise-related impacts, attended noise monitoring would be undertaken at surrounding residences.

6.4.2. Measured Performance

Quarterly attended noise monitoring programs were undertaken during the reporting period by EMM Consulting Pty Limited (EMM). The resulting reports are presented as **Appendix 4**.

All noise monitoring was undertaken under the following operational conditions.

- extraction of basalt using standard drill, blast, load, and haul techniques.
- processing of extracted basalt and stockpiling; and
- transportation of quarry products.

Noise monitoring was undertaken at intermediate locations N1 and N2 (see **Figure 3**) during each monitoring campaign. The noise monitoring results are summarised in **Tables 10 to 13**.

6.4.3. Discussion and Analysis

It is noted that in accordance with the Industrial Noise Policy (INP), a modification factor of five decibels has been applied in situations where low frequency noise (LFN) attributable to the Quarry was identified and where there is a difference of 15 decibels or more between 'C' weighted and 'A' weighted noise levels. In October 2017, the EPA published the Noise Policy for Industry. Although assessment of noise levels from Quarry operations continue to apply under the INP, the transitional arrangements for the Noise Policy for Industry require that the treatment of tonal or low frequency noise in accordance with this policy applies regardless of when the approval was granted. Therefore, EMM Consulting treated low frequency noise in accordance with the Noise Policy for Industry (EPA, 2017) and applied a modifying factor to recorded noise levels where relevant. There were no instances where low frequency noise modification factors were applied during the 2020 reporting period.

Several instances were recorded where wind speeds greater than 3m/s were identified. In these instances, the noise limits do not apply (see Condition L4.7 of Environment Protection Licence 20190).

Noise levels at locations N1 and N2 complied in all instances during the reporting period.

Table 10: Noise Monitoring Results – 19 March 2020

Location	Time (hrs)	Attended Noise Monitoring Results (dB(A))					Criteria dB	Met conditions ¹		Comments
		Total measured			Site Contribution			Wind Speed (m/s)	Wind Direction (degrees from North)	
		LAeq	LAmax	LA90	LFN Mod Factor	LAeq	LAeq			
N1	09:01	37	59	31	Nil	<30	43	3.0	197	Criteria doesn't apply Site audible at times including FEL and other machinery/trucks traversing (engine revs). Other sources include consistent traffic noise from the Mitchell Highway, occasional birdsong, and insects.
	10:12	41	69	41	Nil	<32	43	4.3	220	Criteria doesn't apply Site audible at times including FEL, other machinery/trucks traversing (engine revs) and infrequent "bangs/clangs" from maintenance work. Other sources include consistent traffic noise from the Mitchell Highway, livestock, and aircraft overflights.
N2	09:27	42	61	36	Nil	<40	50	4.3	219	Criteria doesn't apply Site audible at times including FEL, other machinery/trucks traversing (engine revs) and other maintenance work (power tools). Other sources include consistent traffic noise from the Mitchell Highway, occasional birdsong, and aircraft overflights.
	09:44	46	69	33	Nil	<38	50	5.1	217	Criteria doesn't apply Site audible at times including FEL, other machinery/trucks traversing (engine revs), a light vehicle traversing and other maintenance work (power tools). Other sources include consistent traffic noise from the Mitchell Highway, occasional birdsong, and aircraft overflights.

Note 1: Meteorological data was recorded at BOM AWS located at Orange Airport (at a height of 10m above ground).

Note 2: A low frequency noise (LFN) modifying factor has not been applied as noise levels did not exceed relevant LFN thresholds and/or it is only applied during assessable meteorological conditions.

N/A: Not Applicable.

Source: EMM (2019a) – Table 3

Table 11: Noise Monitoring Results – 17 June 2020

Location	Time (hrs)	Attended Noise Monitoring Results (dB(A))					Criteria dB	Met conditions ¹		Comments
		Total measured			Site Contribution			Wind Speed (m/s)	Wind Direction (degrees from North)	
		LAeq	LAmax	LA90	LFN Mod Factor	LAeq	LAeq			
N1	11:09	44	58	39	Nil	36	42	6.6	98	Criteria doesn't apply. Site occasionally audible during lulls in traffic including crushing plant. Other sources include consistent traffic noise from Mitchell Highway and occasional birdsong.
	11:25	43	54	38	Nil	35	42	6.8	95	Criteria doesn't apply. Site occasionally audible during lulls in traffic including crushing plant and machinery revs. Other sources include consistent traffic noise from Mitchell Highway and occasional birdsong.
N2	10:19	43	59	39	Nil	42	50	2.3	147	Criteria does apply. Site consistently audible including crushing plant, machinery traversing and grinding. Other sources include consistent traffic noise from Mitchell Highway and occasional birdsong.
	10:36	42	61	36	Nil	38	50	4.4	115	Criteria doesn't apply. Site consistently audible including crushing plant and machinery traversing. Other sources include consistent traffic noise from Mitchell Highway, occasional birdsong, livestock (sheep) and an aircraft overflight.
Note 1: Meteorological data was recorded at BOM AWS located at Orange Airport (at a height of 10m above ground).										
Note 2: A low frequency noise (LFN) modifying factor has not been applied as noise levels did not exceed relevant LFN thresholds and/or it is only applied during assessable meteorological conditions.										
N/A: Not Applicable.										
Source: EMM (2019a) – Table 3										

Table 12: Noise Monitoring Results – 15 September 2020

Location	Time (hrs)	Attended Noise Monitoring Results (dB(A))					Criteria dB	Met conditions1		Comments
		Total measured			Site Contribution			Wind Speed (m/s)	Wind Direction (degrees from North)	
		LAeq	LAmax	LA90	LFN Mod Factor	LAeq	LAeq			
N1	11:05	38	58	33	Nil	34	43	2.9	31	Criteria does apply. Quarry audible throughout measurement including hum of crushing/screening plant and trucks/machinery traversing. Other ambient noise included birdsong, highway traffic, a farmer on quad bike and a dog barking.
	11:20	28	60	31	Nil	34	43	3.0	27	criteria does apply. Quarry audible throughout measurement including hum of crushing/screening plant and trucks/machinery traversing. Other ambient noise included birdsong, insects, highway traffic, livestock (cows) and two aircraft overflights.
N2	11:53	39	64	33	Nil	37	50	3.8	12	criteria doesn't apply Quarry dominant throughout measurement including hum of crushing/screening plant, FEL handling material and trucks/machinery traversing. Other ambient noise included birdsong and highway traffic.
	12:08	37	54	32	Nil	36	50	2.7	14	criteria does apply. Quarry dominant throughout measurement including hum of crushing/screening plant, FEL handling material and trucks/machinery traversing. Other ambient noise included birdsong, highway traffic and an aircraft overflight.

Note 1: Meteorological data was recorded at BOM AWS located at Orange Airport (at a height of 10m above ground).

Note 2: A low frequency noise (LFN) modifying factor has not been applied as noise levels did not exceed relevant LFN thresholds and/or it is only applied during assessable meteorological conditions.

N/A: Not Applicable.

Source: EMM (2019a) – Table 3

Table 13: Noise Monitoring Results – 26 November 2020

Location	Time (hrs)	Attended Noise Monitoring Results (dB(A))					Criteria dB	Met conditions ¹		Comments
		Total measured			Site Contribution			Wind Speed (m/s)	Wind Direction (degrees from North)	
		LAeq	LAmx	LA90	LFN Mod Factor	LAeq	LAeq			
N1	13:46	50	72	37	Nil	<37	43	4.2	217	Criteria doesn't apply. Quarry activities very faintly audible throughout measurement. Other ambient noise included birdsong, persistent cicada drone, foliage rustle, highway traffic (dominant) and two turboprop aircraft fly-bys.
	14:02	46	60	39	Nil	<39	43	4.3	214	Criteria doesn't apply. Quarry activities very faintly audible throughout measurement. Other ambient noise included birdsong, persistent cicada drone, foliage rustle, highway traffic (dominant) and two turboprop aircraft fly-bys.
N2	12:55	42	75	36	Nil	40	50	4.0	237	Criteria doesn't apply. Quarry dominant throughout measurement including hum of crushing/screening plant, FEL handling material and trucks/machinery traversing. Other ambient noise included frequent, highly variable birdsong and persistent cicada drone.
	12:11	39	58	36	Nil	39	50	4.3	216	Criteria doesn't apply. Quarry dominant throughout measurement including hum of crushing/screening plant, FEL handling material and rucks/machinery traversing. Other ambient noise included frequent, highly variable birdsong and persistent cicada drone.
Note 1: Meteorological data was recorded at BOM AWS located at Orange Airport (at a height of 10m above ground).										
Note 2: A low frequency noise (LFN) modifying factor has not been applied as noise levels did not exceed relevant LFN thresholds and/or it is only applied during assessable meteorological conditions.										
N/A: Not Applicable.										
Source: EMM (2019a) – Table 3										

In summary, the attended monitoring program undertaken throughout the reporting period confirmed that the Quarry satisfied requirements with regards to the assessment criteria. This is consistent with the predictions included in the *Environmental Assessment* (EA) (Hanson, 2009) and *Noise Management Plan* (RWC, 2013) and the results of previous noise monitoring at the Quarry. Noise levels at location N1 and N2 were consistent with those in previous years.

Monitored noise levels generally remain within the approved criteria and predictions made in the EA. The noise criteria provided in *PA 06_0193* is generally 35dB(A), suggesting that noise levels were predicted to be generally lower than the rating background noise level and minimum assumed for assessment under the Industrial Noise Policy. However, Hanson notes that noise predictions made in the EA are based on worst-case scenario events and are therefore conservative.

Historic noise monitoring conducted between September 2013 and November 2020 has indicated that the Quarry's contribution to noise levels at locations N1 and N2 range between 25dB(A) (7 December 2015) and 51dB(A) (29 November 2016), taking into account a 5dB(A) penalty for the contribution of low frequency noise in some cases and also including those instances where wind speed exceeded 3m/s during the monitoring period. There have also been several occasions when the site was inaudible from the monitoring locations. There are no identifiable trends in noise levels, except the continued compliance of the operation. As quarrying operations continue to the south of the existing active disturbance, it would be expected that noise levels experienced at properties to the south of the Quarry would increase, though it is predicted that noise levels would remain within the approved limits.

6.5. BLASTING

6.5.1. Public Notices, Property Inspections and Property Investigations

Condition 3(15) of PA 06_0193 requires the Company to:

- operate a blasting hotline and advertise the hotline number in a local newspaper at least twice a year, or operate an alternate system agreed to by the Secretary, to enable the public to get up-to-date information on the blasting schedule;
- publish an up-to-date blasting schedule on its website; and
- notify the landowner/occupier of any residence within 2 kilometres of the site about the blasting schedule, blasting hotline and its website.

The blasting hotline (02 6368 7130) was advertised in the public notice section of the *Western Advocate* (Bathurst) and *Central Western Daily* (Orange) in September 2020. In addition, blasting schedules for the coming month are published on the quarry website each month. Finally, the Company provides written notification of planned blasts to all residents within 2km of the Site prior to each blast.

6.5.2. Predicted Impacts and Performance Criteria

Table 14 identifies predicted blasting-related impacts at surrounding residences (**Figure 6**).

Table 15 presents the airblast overpressure and ground vibration performance criteria identified in *Conditions 3(8) and 3(9) of PA06_0193*.

Table 14: Predicted Levels of Blast Emissions

Residence	Distance from Closest Blasting	Ground Vibration (mm/s)	Airblast Overpressure (dB Linear)
"Cadira Vale"	750m – 340m	1.1 – 4.0mm/s	111 – 119dB Linear
"Hartley Cottage"	1,250m – 810m	0.5 – 1.0mm/s	106 – 110dB Linear
"Fairview"	1,480m – 920m	0.4 – 0.8mm/s	104 – 109dB Linear
"Lilactime"	2,025m – 1,720m	0.2 – 0.3mm/s	101 – 103dB Linear

Source: Heggies (2007a) Modified Table 18

Table 15: Blasting-related Performance Criteria

Allowable exceedance	Airblast overpressure level (DB (Lin Peak))	Peak particle velocity (mm/s)
5% of the total number of blasts in a 12 month period	115	5
0% of the total number of blasts in a 12 month period	120	10

In order to minimise inconvenience for surrounding residents, the Blast Management Plan identifies three blast monitoring locations within land owned by the Company, with a fourth located adjacent to the access road for the "Fairview" residence (**Figure 3**).

In addition to the above criteria, *Conditions 3(10) and 3(11) of PA06_0193* permit blasting between 9:00am and 3:00pm, Monday to Friday. No blasting is permitted on Saturdays, Sundays or Public Holidays. The Company may initiate up to:

- two blasts per day; and
- five blasts per week, averaged over a calendar year.

6.5.3. Measured Performance

Table 16 presents the results of blast monitoring during the reporting period.

Blast monitoring was also undertaken at the Cadira property throughout 2020 following commencement of monitoring at this location in November 2017. Blast monitoring was conducted on each of the dates listed in **Table 16**.

Table 16: Blast Monitoring Results

Date		B1 (Cadira Vale)		B2 (Hartley Cottage)		B3 (Front Gate)		B4 (Fairview)		B5 (Cadira)	
		Ground Vibration (mm/s)	Air Blast (dB)	Ground Vibration (mm/s)	Air Blast (dB)	Ground Vibration (mm/s)	Air Blast (dB)	Ground Vibration (mm/s)	Air Blast (dB)	Ground Vibration (mm/s)	Air Blast (dB)
Criteria	95%/yr	5	115	5	115	5	115	5	115	5	115
	100%	10	120	10	120	10	120	10	120	10	120
22/01/2020		2.2	107	NT	NT	NT	NT	0.64	108	NT	NT
20/02/2020		3.98	111.8	0.898	116.1	NT	NT	NT	NT	0.64	101.9
16/04/2020		NT	NT	NT	NT	0.5	100	1.37	107	0.64	101.9
09/06/2020		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
04/06/2020		4.45	106.5	0.88	107.5	NT	NT	NT	NT	1.35	105
19/06/2020		0.69	109.5	0.12	92.3	0.44	102.3	0.53	103.5	1.3	100.1
19/06/2020		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
23/07/2020		0.9	105.7	NT	NT	0.61	102.1	0.5	104.7	1.8	93.9
13/08/2020		3.78	107.1	NT	NT	NT	NT	0.59	103.9	2.73	103.9
13/08/2020		0.6	114.7	NT	NT	NT	NT	0.66	106.5	NT	NT
22/09/2020		NT	NT	NT	NT	NT	NT	1.01	104.7	NT	NT
29/10/2020		0.79	111	0.68	107.6	NT	NT	0.51	111.9	1.1	105.9
17/11/2020		NT	112	NT	NT	1.12	99.1	0.95	100.2	0.08	112.8
10/12/2020		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
10/12/2020		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
11/12/2020		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
11/12/2020		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
17/12/2020		0.61	104.7	0.95	102.6	0.73	105.6	NT	NT	1.08	102.2
17/12/2020		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
18/12/2020		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Note: NT = Blast Monitor Not Triggered.											
Source: Hanson Construction Materials Pty Ltd											

6.5.4. Discussion and Analysis

The criterion of 5mm/s for ground vibration and 115dB for air blast overpressure was exceeded once in 2020. A total of 21 blasts occurred in 2020 resulting in 4.7% of blasts exceeding 115dBL criteria for air blast overpressure.

Blasting results therefore did satisfy the criteria presented in **Table 15**. The criteria were not exceeded in 2018, 2017, 2016 or 2015. The blast monitor B1 has continued to register results which are higher relative to those recorded at other locations (albeit within criteria levels). This is most likely a factor of the proximity of this monitor to the blast locations in the northern section of the extraction area.

EMM reviewed the blast monitoring results in reports dated 19 March 2020, 17 June 2020, 15 September 2020, and 26 November 2020 (Appendix 4) and noted that all but one air blast overpressure and ground vibration monitoring results satisfied relevant criteria.

It is noted that the resident at the Cadira property has requested that blast monitoring be undertaken due to concerns about structural damage at the property resulting from blasting activities. Hanson is confident that the blasting activities are not the cause of structural damage at this property. Blast activities during the reporting period failed to trigger the monitor at location B5 for twelve of the 21 blasts monitored during the 2020 reporting period, supporting the conclusion that blast activities are not the cause of structural damage. It is acknowledged that a structural assessment of the property undertaken on 15 June 2016 was unable to rule out blasting activities as a cause of cracking, therefore, Hanson will continue to implement monitoring at this location at the request of the landowner.

Over the course of the Quarry's operation, generally all blasts have remained below the performance criteria. The ground vibration levels at location B1 have gradually increased over the course of the Quarry's operation as blasting has moved north and approached closer to monitoring location. However, the data shows that blasting is being effectively designed and managed to ensure that the ground vibration criteria at location B1 is not exceeded.

6.6. AIR QUALITY

6.6.1. Predicted Impacts and Performance Criteria

Table 17 presents the predicted cumulative air quality impacts at the closest potentially affected residences to the Quarry (**Figure 4**). **Tables 17** and **18** present the air quality performance criteria presented in *Condition 3(18)* of PA06_0193.

Table 17: Predicted Cumulative Air Quality Impacts – Stage 1, 3 and 7

Receptor ¹	Stage	Cumulative Depositional Dust annual average (g/m ² /month) ²	Cumulative Pm10 24- hour average (ug/m ³) ³	Cumulative PM10 annual average (ug/m ³) ⁴
<i>Performance Criteria</i>		4.0	50	30
"Cadira"	1	1.7	39	15
	3	1.8	40	15
	7	1.8	39	15
"Hartley Cottage"	1	1.9	43	15
	3	2.1	44	16
	7	2.0	44	16
"Quinton"	1	1.7	39	15
	3	1.7	39	15
	7	1.7	39	15
"Lilactime"	1	1.7	40	15
	3	1.7	42	15
	7	1.7	40	15
"Fairview"	1	1.7	9	15
	3	1.8	39	15
	7	1.8	42	16
"Cadira Vale"	1	1.7	39	15
	3	1.7	39	15
	7	1.7	39	15
Note 1: See Figure 6 for location				
Note 2: Total includes ambient air quality level of 1.6g/m ² /month plus predicted contribution by the Quarry				
Note 3: Total includes varied ambient air quality levels plus predicted contribution by the Quarry				
Note 4: Total includes ambient air quality level of 13µg/m ³				
Sources: Heggies (2007b) – Modified from Tables 8, 9, 10				

Table 18: Air Quality-related Performance Criteria – Suspended Particulates

Pollutant	Averaging period	Criterion	Basis
Total suspended particulate (TSP) matter	Annual	90ug/m3	Total
Particulate Matter < 10um (PM10)	Annual	30ug/m3	Total
Particulate matter <10um (PM10)	24 hour	50ug/m3	Total

Table 19: Air Quality-related Performance Criteria – Deposited Dust

Pollutant	Averaging period	Maximum increase in deposited dust levels	Maximum total deposited dust level
Deposited Dust	Annual	2g/m2/month	4g/m2/month

6.6.2. Measured Performance

6.6.2.1. Total Suspended Particulate Matter

Section 11 of the approved *Air Quality Monitoring Program* (AQMP) dated February 2013 establishes the procedures to be implemented at the Quarry to satisfy *Condition 3(20)* of PA06_0193 regarding air quality monitoring. The AQMP states:

“There are established relationships between PM₁₀ and TSP for extractive industries whereby if the PM10 long-term impact assessment criterion is satisfied the TSP criterion can also be expected to be satisfied. In view of this, PM10 monitoring is proposed as a surrogate for demonstration of compliance with the TSP criterion in Table 8, and thus no TSP monitoring is to be undertaken.”

The AQMP was prepared and submitted to DPIE in February 2013. In accordance with this program, no monitoring of TSP is undertaken at the Quarry with compliance demonstrated through established compliance with the long-term criteria for PM₁₀. Following approval of Modification 2 in 2019, the AQMP required updating with a draft provided to DPIE in 2019.

6.6.2.2. Deposited Dust

Deposited dust monitoring commenced at monitoring locations DG1, DG2 and DG3 on 27 February 2013 and continued on a monthly basis during the reporting period. A new deposited dust monitoring location, DG4, was added in the second quarter of 2018 to improve monitoring of conditions to the southwest of the Quarry. The locations of the deposited dust monitoring locations are shown on **Figure 3**. **Table 20** presents the results of the deposited dust monitoring program for 2020 and the 2019 average for comparison.

All samples recorded in 2020 varied between 0.1g/m²/month and 9.5g/ m²/month. The highest deposited dust level recorded during the reporting period was 9.5/ m²/month, recorded at DDG4 over January 2020. DDG1, DDG2 and DDG3 similarly recorded a high deposited dust level during this period. These relatively high results may be attributable to arid conditions in the region, with state level fires in the first quarter 2020 to deposited dust levels recorded at the Quarry.

Table 20: Measured Performance – Deposited Dust¹

Start Date	End Date	DG1	DG2	DG3	DG4	Criterion ²
2019 Annual Average		2.3	3.9	3.8	3.1	
24-Dec-19	21-Jan-20	0.7	1.9	1.8	3.2	
22-Jan-20	9-Mar-20	7.0	5.0	7.0	9.5	
21-Feb-20	6-Apr-20	8.1	7.5	7.9	5.8	
23-Mar-20	22-Apr-20	1.2	1.8	1.4	6.7	
24-Apr-20	2-Jun-20	0.6	7.4	6.1	1.0	
25-May-20	20-Jul-20	1.0	0.5	1.7	0.7	
25-Jun-20	13-Aug-20	0.2	0.3	3.1	0.9	
23-Jul-20	26-Aug-20	0.1	0.7	1.2	0.4	
24-Aug-20	23-Sep-20	0.6	0.8	1.6	0.8	
23-Sep-20	26-Nov-20	0.4	0.6	0.6	1.6	
24-Oct-20	26-Nov-20	0.7	0.5	3.5	5.3	
24-Nov-20	14-Jan-21	0.9	5.9	1.9	7.8	
23-Dec-20	14-Jan-21	1.5	3.6	0.6	2.9	
Annual Average		1.9	2.9	3.1	3.6	4.0
Note1: Units – g/m2/month						
Note 2: Averaged over 12-month period						
Note 3: B – Monitoring equipment broken						
Source: Hanson Construction Materials Pty Ltd						

The 2020 annual average at Dust Gauge 4 was higher than in 2019 with Dust Gauges 1, 2 and 3 all lower than in 2019. Deposited dust monitoring results indicate that average annual rates of dust deposition in the vicinity of the Quarry remain below the criterion levels at each location.

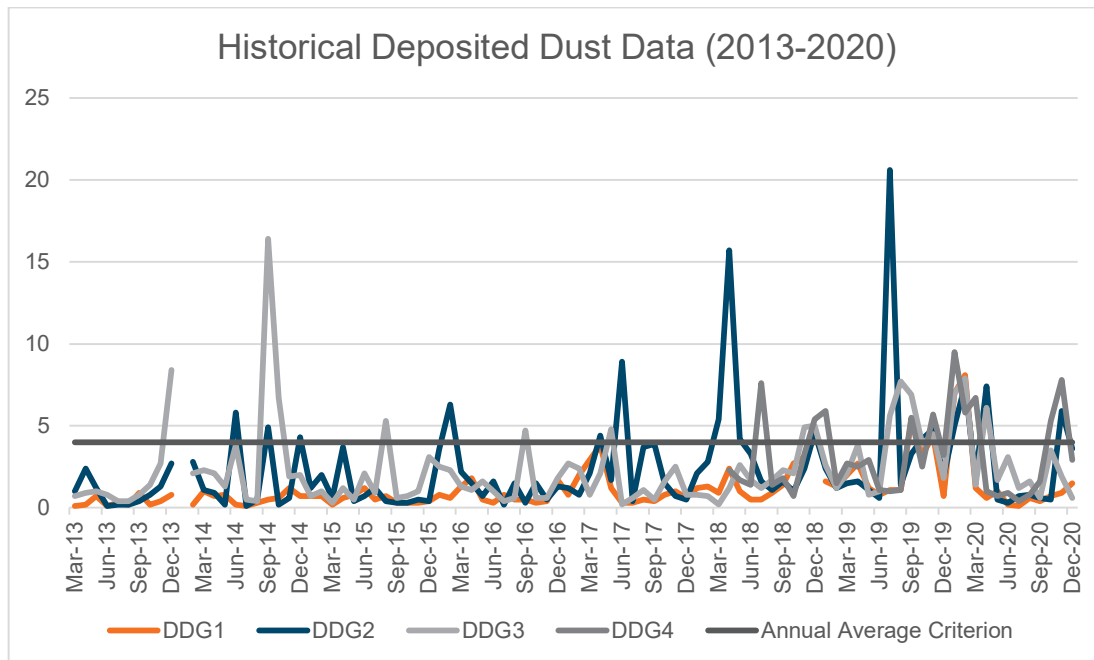


Figure 6: Deposited Dust 2013-2020

Deposited dust monitoring data from March 2013 to December 2020 is presented in **Figure 6**. This chart shows that deposited dust has predominantly remained below the annual average criterion with the following exceptions.

- At Dust Gauge 1 on two occasions in September and November 2019 and on two occasions in January and February 2020.
- At Dust Gauge 2 on four occasions in May, August, and November 2014, on one occasion in March 2016, on one occasion in December 2018, on three occasions in July, October, and November 2019 and on four occasions in January, February, April, and November 2020.
- At Dust Gauge 3 on five occasions in December 2013, August and September 2014, July 2015, October 2016, December 2018, four occasions in July, August, September, and November 2019 and on three occasions in January, February, and April 2020.
- At Dust Gauge 4 December 2018, three occasions in January, September, and November 2019 and on five occasions in January, February, March, October, and November 2020.

However, these exceedances do not form part of any discernible long-term trends in dust levels, but rather generally appear to occur in isolation before returning to levels below the criterion the following month. Monitored deposited dust levels were impacted by state fires in the first half of 2020 across all dust gauges.

6.6.2.3. PM₁₀ Concentration

The concentration of PM₁₀, namely that component of suspended particulates with an aerodynamic diameter of 10µm or less, commenced at monitoring location PM₁₀ on 24 January 2012 using a DustTrak PM₁₀ monitor (**Figure 3**). **Figure 7** presents the results of the PM₁₀ dust monitoring during the reporting period.

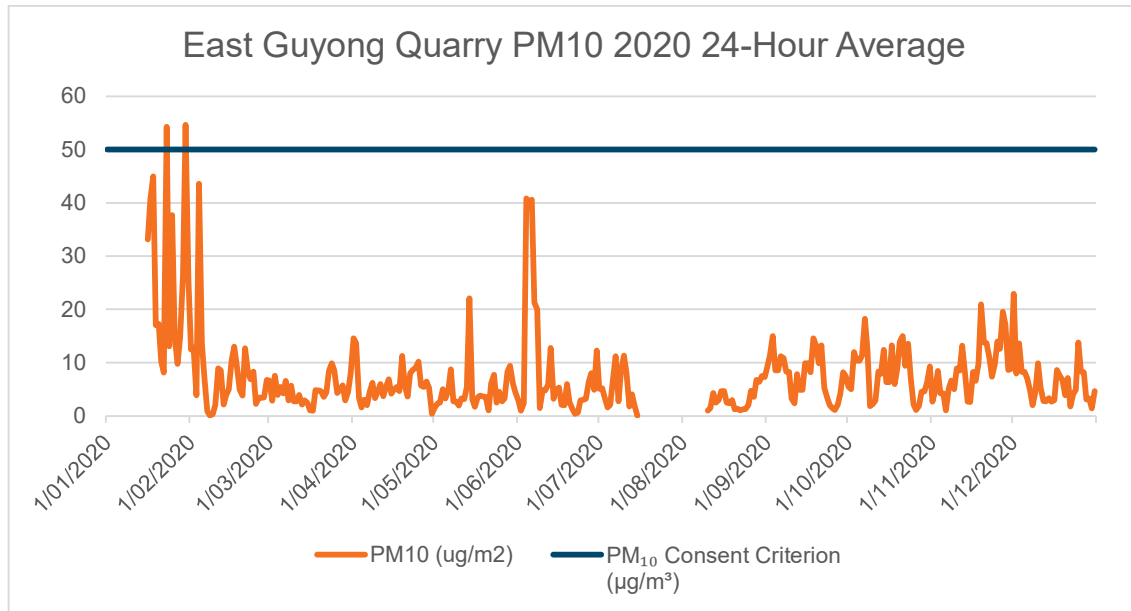


Figure 7: East Guyong Quarry average 24-hour PM₁₀ Dust Concentration 2020

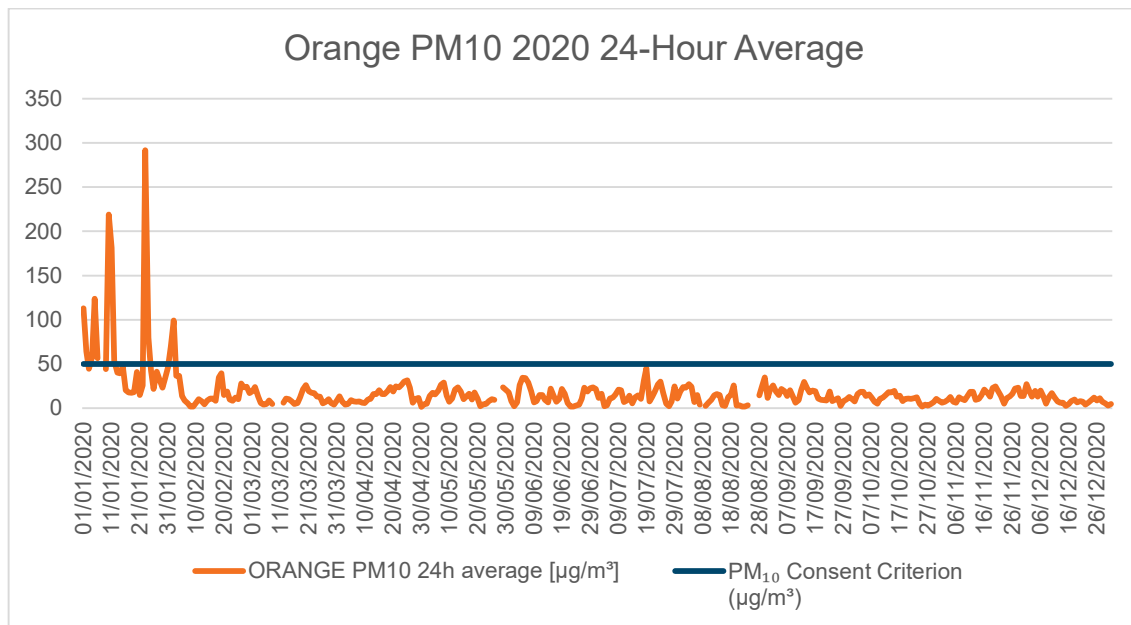


Figure 8: Orange average 24-hour PM₁₀ Dust Concentration 2020

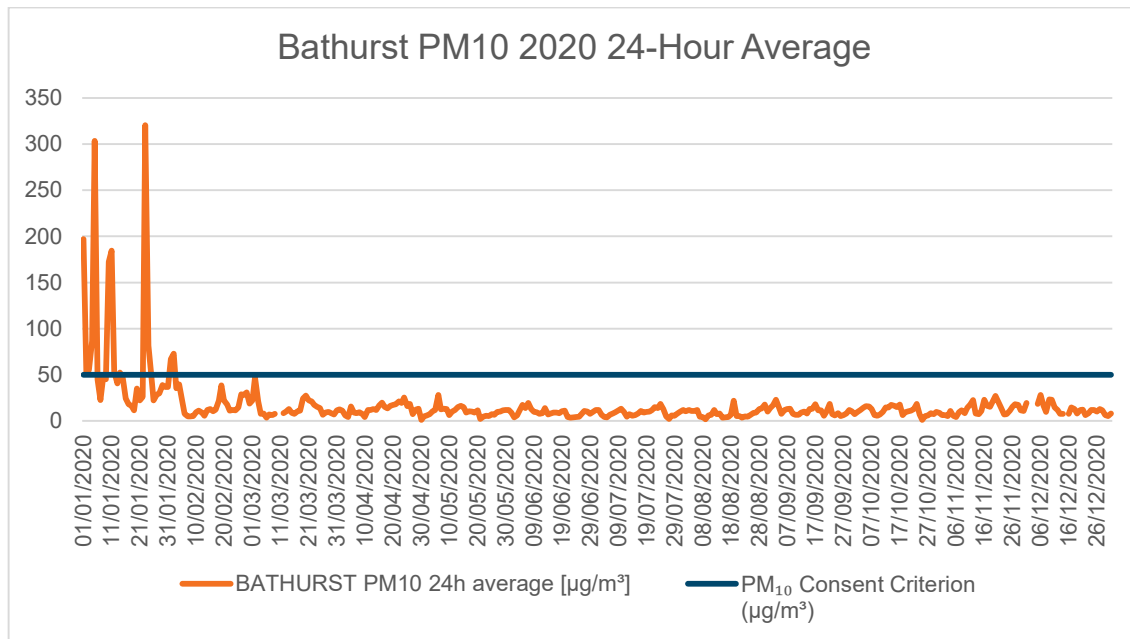


Figure 9: Bathurst average 24-hour PM₁₀ Dust Concentration 2020

The DustTrak PM₁₀ monitor did not record PM₁₀ concentrations for two periods during the 2020 reporting period (see **Figure 7**). The DustTrak PM₁₀ monitor was sent to the manufacturer for repair or routine recalibration during this period (further discussed in Section 11.2). Bathurst and Orange 2020 PM₁₀ 24-hour dust concentration are provided in **Figure 9** and **Figure 10** as an indication of background levels experienced at East Guyong Quarry.

The criterion for average 24-hour PM₁₀ concentrations of 50µg/m³ PM₁₀ was exceeded two times during the reporting period, though each exceedances was confirmed to be due to background levels (NSW bushfire smoke January 2020) and thus not an exceedance generated by the project (further discussed in Section 11.2).

In the past Quarry staff reported bush fire related PM₁₀ exceedances to the Department of Planning, Industry and Environment NSW and were advised that future exceedances should be noted in Annual Reviews for the Quarry but should not be reported individually to the DPIE.

The monitored result for average annual PM₁₀ (excluding periods where PM₁₀ was not monitored) was 9.97 µg/m³ during the reporting period, which is below the criteria level of 25µg/m³.

6.6.3. Discussion and Analysis

The results of dust and particulate monitoring during the reporting period demonstrate an increase compared to past years. This is most likely due to local and regional weather conditions, as measures implemented by Hanson in 2017 following an air quality review appeared to have effectively reduced dust concentrations during the previous reporting period.

Review of historic deposited dust and particulate matter monitoring indicates the following.

- There is no discernible trend in deposited dust monitoring results with deposited dust levels generally remaining within criteria levels.
- Particulate matter emissions have increased over levels recorded in 2016 and 2017 which may have resulted from the increased intensity of operations as they have increased to the approved levels.

6.7. HERITAGE

The Aboriginal heritage assessment for the Quarry identified no objects of Aboriginal or non-Aboriginal heritage significance within the Quarry. Notwithstanding this, Section 8.3 of the *Aboriginal Cultural Heritage Management Plan* identifies that on the first day of ground disturbance within the Infrastructure or Extraction Areas, a sites officer (as agreed by the Aboriginal community) will be commissioned to inspect the ground disturbance. The Company invited the Orange Local Aboriginal Land Council to inspect the Infrastructure Area on 28 May 2013. A copy of that letter was presented with the 2012/2013 Annual Review. No response to either the letter or phone call was received.

Prior to disturbance within the expanded pit extraction area, as approved within Modification 2 of the consent, Hanson contacted Orange Local Aboriginal Land Council (OLALC) to provide notification regarding the planned works. OLALC agreed to undertake an Aboriginal Cultural Heritage Investigation (Report provided as Appendix 7) with the site visit occurring 8 April 2020. During the investigation, four probable culturally modified trees were identified close to the proposed quarry extension.

Hanson engaged an archaeologist (OzArk) to provide an assessment (Appendix 7) on the four probable scarred trees identified by OLALC field officers. Taking into consideration the previous environmental assessments, including heritage, as well as applying the scarred tree criteria (an accepted standard for identifying culturally modified trees) it was concluded that the four trees were not culturally modified trees with one tree unable to be determined based on photographs from Orange Local Land Council but determined to be highly unlikely to be a culturally modified tree.

The management measures identified in Section 8 of the Aboriginal Cultural Heritage Management Plan were implemented during the reporting period and no items of suspected Aboriginal heritage significance were identified.

6.8. TRAFFIC AND TRANSPORT

Construction of the intersection of the Site Access Road and Mitchell Highway was completed on 26 April 2013 with final sealing of the Site Access Road completed in early 2014.

Transportation activities during the reporting period occurred during the approved hours of operation (Section 2.3.2). It is noted that an extension to the approved hours for product despatch was approved on 10 September 2015 following negotiated agreements being reached with surrounding landowners (see **Appendix 2**).

6.9. VISUAL

Operations with the potential to adversely impact visual amenity during the reporting period included earthmoving activities during soil stripping campaigns, and drill and blasting operations within the Extraction Area. The Fixed Processing Plant will remain the most visible feature of the Quarry.

The Company implemented the following management measures during the reporting period to minimise visual amenity impacts associated with its operations (Figure 3).

- Complete construction of the southern amenity bund, including grassing and planting of tubestock.
- Ongoing maintenance of the eastern amenity bund and associated tubestock.

The Company notes that the eastern and southern visual amenity bunds, once revegetated, will screen the majority of the Infrastructure Area from views to the east screen the Quarry from views to the south. Additional tubestock, conditioned in the site nursery facility, will continue to be planted along the eastern and southern amenity bunds in 2020 to replace those lost due to unfavourable weather conditions. Vegetation to be established on the upper sections of the batter in the northwest section of the Infrastructure Area will soften the visual impact of that section of the Site.

Rehabilitation activities during the next reporting period will extend to the progressive shaping and revegetation of the western visual amenity screen.

6.10. WASTE MANAGEMENT

Waste generation during the reporting period was negligible, with general waste placed within skip bins that are serviced monthly by a licenced waste contractor. Liquid wastes, principally waste hydrocarbons generated during equipment servicing, were removed from the Quarry Site on the day they were generated. Ablutions facilities and a septic system are located within the office and weighbridge area.

6.11. EMERGENCY AND HAZARDS

Diesel delivered to the Quarry Site was delivered in bulk by a diesel supplier and stored in a self-bunded diesel tank. Refuelling was undertaken within the Infrastructure Area. Spill kits were available in the site offices and no significant hydrocarbon spills were reported during the reporting period.

Explosives used during the reporting period were transported to Site by the blasting contractor on the day of the blast. No significant safety hazards occurred during the reporting period.

6.12. BUSHFIRE

Management of bushfire hazards is provided through the Bushfire Management Plan which was previously prepared as a sub-section of a Crisis Management Plan. That plan outlines procedures to be implemented in the event of a bushfire within or surrounding the Site. The Bushfire Management Plan and Crisis Management Plan will be reviewed and updated as necessary.

During the reporting period, the Company maintained fire extinguishers within all offices and on all mobile plant. In addition, the Company and construction contractors each maintain separate water carts with fire-fighting capability within the Quarry.

No fires occurred within the Site during the reporting period.

7. WATER MANAGEMENT

A total of 23.1ML of water was used during the reporting period, mainly for dust suppression and plant operations within the Quarry. 6.17ML of water (of total water used) was sourced from the licenced groundwater bore. The remaining 16.9ML of water was sourced from the water storage dam, which was replenished via plant operations (recycled back into the dam) and from rainfall. Water was discharged from the dam twice during the reporting period. No water was imported to site for operational use.

Farm dam D1 was decommissioned in 2016. Dams D3 and D5 were decommissioned in 2018, with the remaining landforms to be filled and levelled during this reporting period.

7.1. SURFACE WATER

7.1.1. Predicted Impacts and Performance Criteria

The Infrastructure Area and Site Access Road are located in a section of the Quarry Site that drains to the north and east, with surface water from disturbed sections of the Site reporting to the existing Dam D2 (see **Figure 2**) within the Asbestos Exclusion Zone, before flowing off Site via the licenced discharge point W1 (**Figure 3**).

Condition L2.5 of the Quarry's Environment Protection Licence 20190 requires that water discharged from licenced discharge point W1 complies with the following water quality performance criteria.

- Total Suspended Solids – 50mg/L.
- Oil and Grease – 10mg/L.
- pH – between 6.5 and 8.5.

The *Soil and Water Management Plan* indicates that monitoring would be undertaken monthly during discharge.

In addition, the *Soil and Water Management Plan* identifies that the following data will be recorded in this Annual Review.

- Volume of water used for dust suppression purposes.
- Volume of water imported to Site.
- Specific measures implemented as part of the water use reduction program, and their effectiveness.

7.1.2. Measured Performances

Water was discharged twice from Dam D2 during the reporting period.

Table 21: 2020 Discharge Surface Water Quality Results

Date of Discharge	Monitoring Point	Test Type	Results	Criteria	Compliant
26 June 2020	Point 1	Lab	pH – 8.4 TSS - <5 Oil and Grease - <5	pH – 6.5 and 8.5 TSS – 50mg/L Oil and Grease – 10mg/L	Yes
25 August 2020	Point 1	Lab	pH – 7.9 TSS - <5 Oil and Grease - <5	pH – 6.5 and 8.5 TSS – 50mg/L. Oil and Grease – 10mg/L.	Yes

Approximately 23.1ML of water was used during the reporting period for dust suppression purposes, primarily via a water cart, and plant operations.

7.1.3. Discussion and Analysis

Water use during the reporting period was within the licenced allocation of 40ML per annum (see **Table 4**). During the reporting period, water sprinklers were used along some roadways and around some stockpiles to reduce water cart use requirements and simplify dust management measures.

7.2. GROUNDWATER

7.2.1. Predicted Impacts and Performance Criteria

Potential groundwater-related impacts associated with the approved Quarry include drawdown of the regional aquifer of approximately 0.6m as the Extraction Area is extended to its final depth. No significant impacts are anticipated on groundwater quality and flow, surrounding groundwater users, or Groundwater Dependent Ecosystems.

Section 11.3 of the *Soil and Water Management Plan* identifies the following groundwater level performance criteria for surrounding non-Quarry related bores.

- standing water level below 10th percentile measured level; or
- standing water level below intake during normal operation of the bore.

Section 11.4 of the *Soil and Water Management Plan* identifies the locations and frequency of groundwater quality monitoring to occur following commencement of extraction operations. Preliminary groundwater quality performance criteria are presented in **Table 21**.

Table 22: Groundwater Quality Performance Criteria

Parameter	Unit	Long-term Assessment Criteria	Initial Assessment Criteria ¹
pH value	pH	6.5-8.5	6.5-8.5
Electrical Conductivity	µS/cm	Greater than 90 th percentile groundwater quality as determined by ongoing groundwater quality monitoring	
Bicarbonate Alkalinity as CaCO ₃	mg/L		
Carbonate Alkalinity as CaCO ₃	mg/L		
Hydroxide Alkalinity as CaCO ₃	mg/L		
Total Alkalinity as CO ₃	mg/L		
Chloride	mg/L		
Sulphate	mg/L		
Calcium	mg/L		
Magnesium	mg/L		
Sodium	mg/L		
Potassium	mg/L		
Nitrate as N	mg/L		
Nitrite as N	mg/L		
Total Oxidized Nit. As N	mg/L		
Total Phosphorus as P	mg/L		
Arsenic	mg/L		
Manganese	mg/L		
Iron	mg/L		
Note 1: Applies until revised assessment criteria have been determined in consultation with relevant government agencies following receipt of initial 12 months of groundwater quality data.			

7.2.2. Measured Performance

Monitoring of groundwater standing levels was undertaken using automated data loggers which record standing water levels every six hours. It is noted that standing water levels are also measured manually each quarter by Geolyse. **Figure 11** presents the results of monitoring of standing water levels between 1 January 2020 and 31 December 2020 within bore holes BH1 to BH5 (bore locations are provided on **Figure 3**). Long-term monitoring results between 1 January 2013 and 31 December 2020 are presented in **Figure 12**.

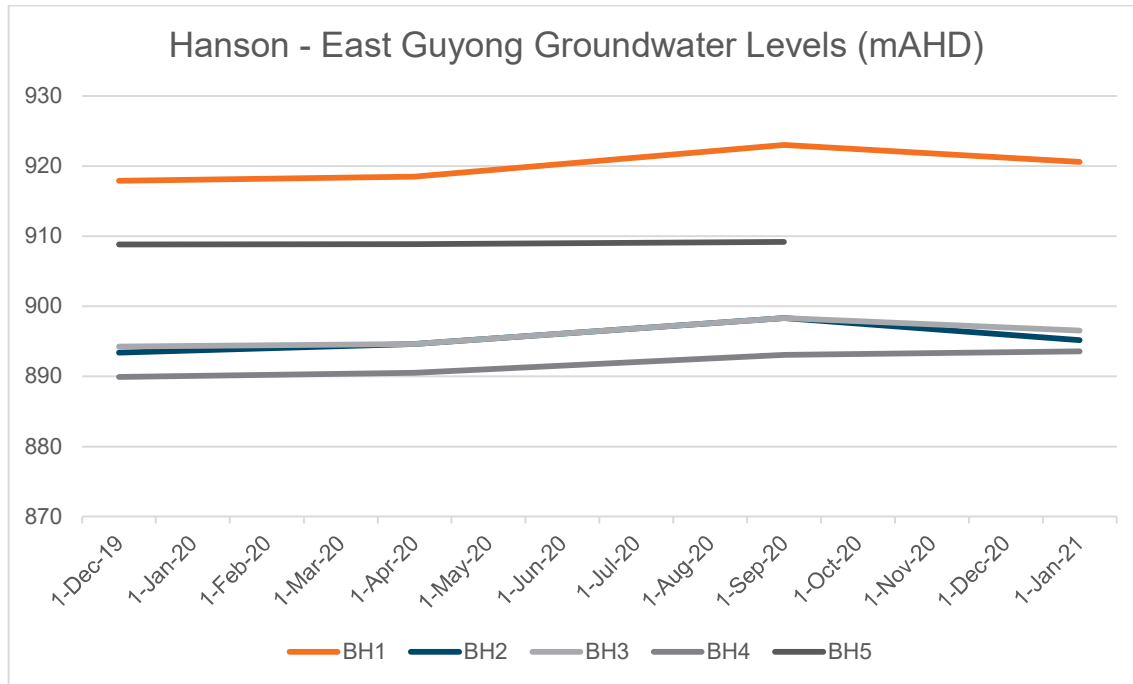


Figure 10 – Groundwater Standing Water Levels (January 2020 to December 2020)

Annual groundwater quality monitoring continued in 2020, with field analysis undertaken in February, May, and August 2020. The results of the field groundwater quality monitoring are presented in **Table 22**. Laboratory analysis of the groundwater samples to measure the suite of analytes was completed in December 2020. The results of this analysis are provided in **Table 23**.

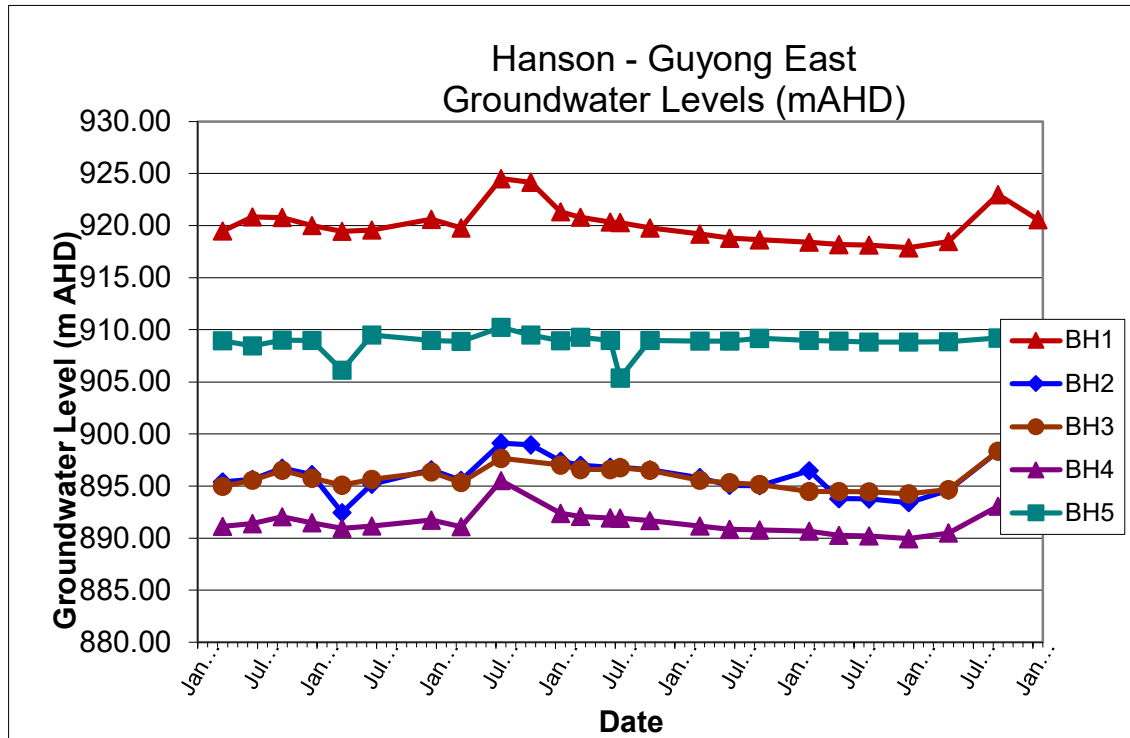


Figure 11 – Groundwater Standing Water Levels (January 2013 to December 2020)

Table 23 – Groundwater Quality Field Monitoring Results 2020

Bore/Analyte	Units	Criteria	April	Sept	Jan
BH1					
Temperature	°C	-	19.0	13.7	14.4
pH	-	6.5-8.5	7.69	7.88	7.54
Electrical Conductivity	µS/cm	-	693	466	389
BH2					
Temperature	°C	-	18.0	13.6	15.7
pH	-	6.5-8.5	7.40	7.92	8.07
Electrical Conductivity	µS/cm	-	666	714	656
BH3					
Temperature	°C	-	16.3	13.8	14.4
pH	-	6.5-8.5	7.61	7.86	8.1
Electrical Conductivity	µS/cm	-	879	728	738
BH4					
Temperature	°C	-	16.2	14.2	15.2

pH	-	6.5-8.5	7.55	7.81	8.1
Electrical Conductivity	µS/cm	-	428	454	396
BH5					
Temperature	°C	-	16.1	14.1	N/A
pH	-	6.5-8.5	7.86	7.72	N/A
Electrical Conductivity	µS/cm	-	481	459	N/A
Source: Geolyse (2020)					

Table 24 – Groundwater Quality Laboratory Assessed Results – December 2020

Analyte	Units	Monitoring Bore				
		BH1	BH2	BH3	BH4	BH5
<i>pH</i>	pH	7.54	8.07	8.1	8.1	-
<i>Electrical Conductivity</i>	µS/cm	389	656	738	396	-
<i>Hydroxide Alkalinity</i>	mgCaCO ₃ /L	<1	<1	<1	<1	-
<i>Carbonate Alkalinity</i>	mgCaCO ₃ /L	<1	<1	<1	<1	-
<i>Bicarbonate Alkalinity</i>	mgCaCO ₃ /L	223	355	398	205	-
<i>Total Alkalinity</i>	mgCaCO ₃ /L	223	355	398	205	-
<i>Sulfate</i>	mg/L	<10	3	8	4	-
<i>Chloride</i>	mg/L	4	12	13	12	-
<i>Calcium</i>	mg/L	41	35	46	30	-
<i>Magnesium</i>	mg/L	20	54	56	29	-
<i>Sodium</i>	mg/L	17	18	28	15	-
<i>Potassium</i>	mg/L	5	4	28	7	-
<i>Arsenic</i>	mg/L	<0.001	0.06	0.004	0.001	-
<i>Manganese</i>	mg/L	0.757	0.001	0.009	0.011	-
<i>Iron</i>	mg/L	0.23	<0.05	<0.05	<0.05	-
<i>Ammonia (as N)</i>	mgN/L	1.28	<0.01	<0.01	0.04	-
<i>Nitrite (as N)</i>	mgN/L	0.01	<0.01	0.05	<0.01	-
<i>Nitrate (as N)</i>	mgN/L	0.12	4.94	3.26	0.24	-
<i>Total Kjeldahl Nitrogen (as N)</i>	mgN/L	4.2	0.6	1.2	1.2	-
<i>Total Nitrogen (as N)</i>	mgN/L	4.3	5.5	4.5	1.4	-
<i>Total Phosphorus (as P)</i>	mgP/L	0.99	0.1	0.48	0.24	-

<i>Total Anions</i>	meq/L	4.57	7.49	8.48	4.52	-
<i>Total Cations</i>	meq/L	4.56	7.08	8.84	4.72	-
<i>Ionic Balance</i>	%	0.1	2.87	2.04	2.14	-
Source: Geolyse (2020)						

7.2.3. Groundwater Extraction

The groundwater extraction undertaken at the Quarry under Water Licence 80AL722920 is presented in **Table 24**.

Table 25 – Groundwater Extraction

Water Licence #	Water Sharing plan, source, and management zone (as applicable)	Entitlement	Passive take/inflows	Active pumping	TOTAL
80AL722920	Water Source: Lachlan Fold Belt MDB Groundwater Source Water Sharing Plan: Water Sharing Plan NSW Murray Darling Basin Fractured Rock Groundwater Sources Management Zone: Lachlan Fold Belt MDB (other) Management Zone	40 Units	0	6.17ML	6.17ML
Source: Hanson Construction Materials Pty Ltd					

7.2.4. Discussion and Analysis

Standing Water Levels

The monitoring data presented in **Figure 11** indicate that standing water levels within all bores remained relatively stable through the reporting period. Upon review of the long-term records, it can be concluded that the groundwater table in the vicinity of these bores is returning to an equilibrium level after heavy rainfall, and therefore infiltration, in the second half of 2016.

Consistent with previous years, variation in water levels in bore hole BH5 coincided with purging during manual water monitoring and demonstrated relatively slow equilibration. Hydraulic testing of this bore for the original Environmental Assessment (Hanson, 2009) indicated a permeability of less than 0.0001m/day. The yield of bore BH5 was assessed to be significantly lower than the remaining four monitoring bores as a result of weathering in the vicinity of these bores and the nature of the basalt surrounding bore BH5. Therefore, the Company considers that the fluctuations in groundwater levels at this bore are the result of water within the bore being removed for sampling and very slowly returning to an equilibrium level.

The Company notes that all ground-disturbing activities were well above the regional water table during the reporting period. As a result, the Company contends that the fluctuations in groundwater levels are wholly attributable to natural causes.

Groundwater Quality

Geolyse undertook three rounds of field groundwater quality monitoring in April, September 2020 and January 2021 (see **Appendix 5**).

Groundwater quality monitoring commenced in March 2014, with field samples for pH and electrical conductivity remaining consistently within expected ranges. It is anticipated that the long-term groundwater quality criteria would be established in consultation with the Department of Planning, Industry and Environment and the National Resources Access Regulator with the planned update to the Soil and Water Management Plan.

8. REHABILITATION PERFORMANCE DURING THE REPORTING PERIOD

Limited areas of the Quarry Site were available for rehabilitation during the reporting period. As a result, landscape management activities were limited to the continued construction and revegetation of permanent amenity bunds. Bunds were constructed from overburden stripped during preparations for blasting and extraction activities. Bunds to the south and to the north of the extraction area were progressively shaped as necessary, with the southern bund being completed during this reporting period. There were no areas within the Quarry Site that were considered to be under active rehabilitation.

The Landscape Management Plan for the Quarry describes that progressive rehabilitation in the short-term (first 5 years of operations) would be limited to construction, shaping and revegetation of permanent amenity bunds, establishment of the western visual amenity screen and revegetation of upper benches within the extraction area. Hanson proposes to continue with shaping of permanent amenity bunds and revegetation of these areas in the short-term. As benches are developed in the extraction area and reach a terminal stage of extraction, a combination of overburden and topsoil would be placed on the benches and the areas revegetated. The Landscape Management Plan proposes that this approach to progressive rehabilitation would also continue in the medium term (that is over the next 5 years of operations). The construction of bunds is not considered to be active rehabilitation as these areas may need to be removed during approved operations.

Hanson has continued to implement weed management practices within the Quarry boundary, and these would continue. There has been no need to commission any feral animal management programs at the Quarry during the reporting period.

A western visual boundary screen assessment report (Appendix 8) was undertaken by Environmental Factor, which details the condition and species assemblage of recent plantings undertaken as part of the western screening vegetation at the Quarry.

A pre-clearance survey report was undertaken in May 2020 to document the pre-clearing steps taken to protect native fauna and biodiversity values within the approved pit expansion area (Appendix 8) with recommendations followed in accordance to the report.

Weed inspections were undertaken during 2020, detailed in **Appendix 8**.

The rehabilitation status of the Quarry is summarised in **Table 25**.

Table 26 – Rehabilitation Status

Mine Area Type	Pervious Reporting Period (Actual) 2018 (ha)	This Reporting Period (Actual) 2019 (ha)	Next Reporting Period (Forecast) 2020 (ha)
A. Total mine footprint	50.4	50.4	50.4
B. Total active disturbance	30.9	35.3	35
C. Land being prepared for rehabilitation	0	0.5	1
D. Land under active rehabilitation	0	0	0
E. Completed rehabilitation	0	0	0
Source: Hanson Construction Materials Pty Ltd			

8.1. ACTIONS FOR THE NEXT REPORTING PERIOD

During the next reporting period, rehabilitation activities will focus on maintenance of revegetation on the southern bund. Activities will involve the monitoring of vegetation and replacement of lost tubestock where required. Hanson will also continue to construct the visual amenity bund to the north of the Extraction Area with final shaping, spreading of topsoil and revegetation to occur in those areas that are completed during this period. Rehabilitation activities during the next reporting period will extend to the progressive shaping and revegetation of the western visual amenity screen.

The Company plans to continue progressive revegetation of the Quarry Site during the next reporting period. It is anticipated that approximately 500 tubestock would be planted along the southern and eastern amenity bunds to replace tubestock lost due to unfavourable conditions in 2019.

Revegetation of disturbed sections of the Site would be undertaken in accordance with the procedures identified in the *Landscape Management Plan*. Tubestock will be stored in the new on-site nursery facility prior to planting, allowing staff to maintain tubestock and plant during periods of favourable weather.

9. COMMUNITY

9.1. CONSULTATION AND COMMUNITY ENGAGEMENT

One meeting of the East Guyong Quarry Community Consultative Committee (CCC) was held during the reporting period on the following date.

- 10 November 2020

Appendix 6 presents the minutes from the meeting. Updates were provided on Quarry operations during the 2020 reporting period.

9.2. COMPLAINTS

No complaints were received during the reporting period. One complaint was received during the previous reporting period in 2019, while none were received in 2018.

Table 27: 2020 East Guyong Quarry Complaints

Month /Year	Incident Date & Time	Mode of Complaint	Comments	Action Taken	Follow-up Contact with Complainant
N/A	N/A	N/A	N/A	N/A	N/A

It should be noted that there is no general trend in the subject of complaints received by the Quarry. Over the last three years, dust has been the most common issue, however, it is considered that this is due to the dry and windy conditions experienced during that time.

Generally, Hanson considers that it has a positive relationship with neighbours and hopes that the local community trust Hanson to thoroughly investigate concerns raised directly or through the Hanson website.

10. INDEPENDENT AUDIT

In accordance with the requirements of Condition 5(8) of PA06_0193, an Independent Environmental Audit (IEA) of the Quarry is to be completed every three years following the initial audit completed on 12 and 13 November 2013.

An Independent Environmental Audit was undertaken in October 2019. The next IEA is due to be completed by October 2022.

Actions that resulted from the October 2019 IEA have been resolved by Hanson as follows:

Issue No.	Condition	Requirement	Issue Sighted	Hanson response	Timing
N-01	Sch 2, Con 15	The Proponent must ensure that all of its employees, contractors (and their sub-contractors) are made aware of, and are instructed to comply with, the conditions of this approval relevant to activities they carry out in respect of the project	Evidence that contractors (and their sub-contractors) are made aware of, and are instructed to comply with, the conditions of this approval relevant to activities they carry out not available.	Hanson will be creating a site-specific induction, including the requirements set out in Section 7 of the Noise Management Plan.	Completed
N-02	Schedule 3, Condition 7	The Proponent must prepare a Noise Management Plan for the project to the satisfaction of the Secretary. This plan must: (a) be prepared in consultation with EPA and be submitted to the Secretary for approval prior to the commencement of construction activities. (b) include: · a description of the measures that would be implemented to minimise noise emissions from the project, with particular focus on: · quarrying operations within 500 metres of residences on privately-owned land. · transportation activities; and · continual improvement of noise performance. · a noise monitoring protocol for evaluating compliance with the relevant noise limits in this approval. · a protocol for the investigation, notification, and mitigation of identified exceedances of the relevant noise limits; and · a continual improvement program for investigating, implementing, and reporting on	All requirements of the NMP had not been implemented. Specifically: · The site induction did not include communication of all noise basic noise awareness training incorporating the requirements of Section 7 of the Noise Management Plan (N-01). · Records were not available to verify that and sound power levels of the mobile equipment complied with the requirements of Section 10.6 of the Noise Management Plan.	Hanson will be creating a site-specific induction, including the requirements set out in Section 7 of the Noise Management Plan. Sound power level of mobile equipment that has changed since the last monitoring occurred will be organised in the next round of compliance noise monitoring.	Completed

		reasonable and feasible measures to reduce noise generated by the project. The Proponent must implement the Noise Management Plan as approved by the Secretary.			
N-03	Schedule 3, Condition 8	The Proponent must ensure that the airblast overpressure level from blasting at the project does not exceed the criteria in Table 4 at any residence on privately-owned land.	One exceedance of the airblast overpressure level occurred in July 2019 (119.2dB).	Exceedance was reported to the correct authorities and recorded within monitoring records. Investigation indicated that the low-lying cloud cover was the most likely cause of the exceedance.	Completed
N-04	Schedule 3, Condition 15	The Proponent must: the development does not result in any queuing on the public road network unless otherwise approved by Council; a) operate a blasting hotline and advertise the hotline number in a local newspaper at least twice a year, or operate an alternate system agreed to by the Secretary, to enable the public to get up-to-date information on the blasting schedule; b) publish an up-to-date blasting schedule on its website; and c) notify the landowner/occupier of any residence within 2 kilometres of the site about the blasting schedule, blasting hotline and its website, to the satisfaction of the Secretary.	Unable to verify that the blasting hotline had been advertised twice yearly in the local newspaper or via an alternate system agreed to by the secretary.	The blasting hotline will be advertised through the Hanson website. We will seek permission from the Secretary for this system to be the alternative to the advertisement of the hotline number in a local newspaper.	Completed
N-05	Schedule 3, Condition 31	Within 3 months of approval of Modification 2, the Proponent must prepare a Landscape Management Plan for the project to the satisfaction of the Secretary. This plan must: (a) be prepared in consultation with OEH, DoI L&W and Council, and be submitted to the Secretary prior to the commencement of quarrying operations; and (b) include a:	The following requirements of the Landscape Management Plan had not been implemented: · quarterly visual inspections of weed infestation and presence within the Quarry Site; · Should the quarterly visual inspections identify weed infestations, additional weed control programs will be undertaken;	While not formally recorded, regular visual inspections of weed infestation is carried out by quarry staff. A quarterly visual inspection sheet will be formatted so formal records are kept.	Completed

		• Rehabilitation and Biodiversity Management Plan; and • Long-Term Management Strategy. The Proponent must implement the Landscape Management Plan as approved by the Secretary. Note: The Department accepts that the initial Landscape Management Plan may not include the detailed Long-Term Management Strategy. However, a conceptual strategy must be included in the initial plan, along with a timetable for augmentation of the strategy with each subsequent review of the plan.	Implement a twice annual weed treatment and reporting program		
N-06	Schedule 3, Condition 36	The Proponent must prepare an Aboriginal Cultural Heritage Management Plan for the project to the satisfaction of the Secretary. This plan must: (a) be prepared in consultation with OEH and Registered Aboriginal Parties, and be submitted to the Secretary for approval prior to any ground disturbance; and (b) be prepared by suitably qualified and experienced person/s; (c) be submitted to the Secretary for approval within 3 months of approval of Modification 2; (d) include a protocol for monitoring ground disturbance associated with construction activities or quarrying operations; (e) describe the measures to be implemented on the site or within any offset area to: (i) ensure all workers on the site receive suitable Aboriginal cultural heritage inductions prior to carrying out any activities which may cause impacts to Aboriginal objects or Aboriginal places, and that suitable records are kept of these inductions; (ii) protect, monitor and manage Aboriginal objects and Aboriginal places identified (including any proposed	Site induction program does not include site-specific Aboriginal cultural heritage details.	Hanson will be creating a site-specific induction, including the requirements set out as required within the Aboriginal Cultural Heritage Management Plan.	Completed

		archaeological investigations and salvage measures); (iii) protect Aboriginal objects and Aboriginal places located outside the approved disturbance area from impacts of the development; (iv) manage any new Aboriginal objects or Aboriginal places discovered during the life of the project; (v) maintain and manage reasonable access for relevant Aboriginal stakeholders to Aboriginal objects and Aboriginal places (outside of the approved disturbance area); and (vi) facilitate ongoing consultation and involvement of Registered Aboriginal Parties in the conservation and management of Aboriginal cultural heritage on the site The Proponent must implement the Aboriginal Cultural Heritage Management Plan as approved by the Secretary.			
N-07	Water Access Licence WAL36530	The licence holder must record the following in the logbook: (i) each date and period of time during which water is taken under this licence; (ii) the volume of water taken on that date; (iii) the water supply work approval number of the water Supply work used to take the water on that date;(iv) the purpose or purposes for which the water taken on that date.	While a logbook was available, the logbook had not been completed since 2017. It was noted that the bore pump runs continuously during daylight hours.	Hanson will be installing an in-line metering system that will digitally read water pumped. It's important to note that the allowable flow rate from the pump and bore is below the allowable water take of the equipment as annually advised within the site's Annual Review to DPIE.	Completed
N-08	EPL 20190, M1.3	The following records must be kept in respect of any samples required to be collected for the purposes of this licence: a) the date(s) on which the sample was taken; b) the time(s) at which the sample was collected;	Dust deposition monitoring reports did not include the time samples were collected or the name of the person who collected the sample.	Consultant has now been notified to follow the requirements as stipulated within the AQMP.	Completed

		c) the point at which the sample was taken; and d) the name of the person who collected the sample.			
N-09	EPL 20190, M2.2	Air Monitoring Requirements	Continuous monitoring of PM10 has not been conducted. The monitor had been out of service since April 2019.	The DustTrak unit has been upgraded to a new telemetry system which caused the delay. When the unit requires repair/service/upgrading a stand-in unit will be hired so that there is minimal disruption to air quality monitoring at the site.	Completed
N-10	EPL 20190, M4.2	The licensee is required to provide the EPA with a Noise Impact Assessment document no later than one month after the attended noise monitoring required by condition M4.1 was carried out that outlines the findings of this noise monitoring.	No records that a Noise Impact Assessment document had been submitted to the EPA within one month of the attended noise monitoring.	The EPA will now be receiving a copy of the attended noise monitoring report within one month of attended noise monitoring.	Completed
N-11	EPL 20190, M8.1	For each discharge point or utilisation area specified below, the licensee must monitor: a) the volume of liquids discharged to water or applied to the area; b) the mass of solids applied to the area; c) the mass of pollutants emitted to the air; at the frequency and using the method and units of measure, specified below.	A flow meter and continuous monitor had not been installed to monitor volume and flow rate of discharge.	Hanson will be installing an in-line metering system that will continuously provide a digital reading of water discharge.	Completed

There are no further outcomes of the IEA that require action from Hanson.

11. INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

11.1. INCIDENTS

No incidents were recorded at the Quarry during the reporting period. There were four non-compliances reported during the reporting period (**Section 11.2**).

11.2. GENERAL COMPLIANCE

Section 1 presents an overview of non-compliances with the conditional requirements of *PA 06_0193* and *EPL20191*. The following presents a more detailed description of each of the recorded non-compliances.

PM₁₀ Monitoring – PM₁₀ Exceedance

There were two recorded exceedances of the PM₁₀ 24-hour average criteria. As noted, both these dates (23 and 30 January 2020) were likely due to high background levels contributed by state-wide bush fires experienced within NSW.

PM₁₀ Monitoring – Operation of Monitor

Monitoring of PM₁₀ concentrations did not occur between 1 January 2020 to 15 January 2020 and 16 July 2020 to 10 August 2020. During the January period a power loss to the DustTrak unit is attributed to the lack of monitoring within the 2020 new year. The issue was detected and rectified once the compliance officer was back from the Company's holiday shutdown period. During the July to August period, the lack of monitoring is due to the PM₁₀ DustTrak monitor being sent to the manufacturer for recalibration and repair. A replacement unit was hired but still resulted in a period where no PM₁₀ monitoring occurred.

The two periods of non-monitoring of PM₁₀ at the site represents a non-compliance with the Air Quality Monitoring Program and is therefore not compliant with *Condition 20 of Schedule 3 of PA 06_0193*. This non-compliance is considered administrative as it would not have contributed to PM₁₀ concentration levels and consequently would not have contributed to an increased risk of environmental harm.

Annual Review – Late Submission

The Department was notified that the 2020 East Guyong Quarry Annual Review will not be submitted by the 31 March due date, as required by *Schedule 5 Condition 3* of Project approval *MP06_0193*. This delay in submission represents a non-compliance with the consent and is therefore not compliant with *Schedule 5 Condition 3* of Project approval *MP06_0193*. This non-compliance is considered administrative as it would not contribute to an increased risk of environmental harm.

Water Discharge – Amount of Discharge Not Monitored

Though not a requirement under *PA 06_0193*, the amount of discharged water from a discharge water event is required to be monitored under *M8.1 of EPL 20190*. Due to the site not needing to discharge after the requirement was placed within the EPL, this requirement was missed with changes to site personnel. EPA were notified within the Annual Return and the discharge point will be upgraded to include the ability to monitor discharge amount. This non-compliance is considered administrative as the water within the dam was attributed to high rainfall and not from processing at the site, as indicated by the water quality test results of both discharge events.

12. ENVIRONMENTAL MANAGEMENT DURING THE NEXT REPORT PERIOD

In addition to the environmental management measures identified in the various environmental management plans, the Company proposes to implement the following environmental management measures during the next reporting period.

- Continue to refine blasting and blast monitoring procedures.
- Monitor and maintain the surface water controls within the Site.
- Establish long-term assessment criteria for groundwater quality in consultation with the Department of Planning, Industry and Environment and the National Resource Access Regulator when sufficient groundwater monitoring results are available.
- Where a final landform is established for the amenity bunds, they will be stabilised through seeding with a groundcover and, where feasible, hydro mulching.
- Re-establish vegetation where previous revegetation programs have failed. The revegetation programs are likely to be implemented in late winter to early spring. Revegetation is planned to include approximately 500 plants.
- Continue to utilise temporary amenity bunds within the Extraction Area until extraction operations have progressed sufficiently that the operations are not visible from surrounding residences or publicly accessible vantage points.
- Utilise the newly established nursery facility to condition and store tubestock in preparation for revegetation activities.
- Calculate noise criteria for noise monitoring location N3 to ensure compliance with relevant noise criteria at surrounding residences.

Hanson has found that there has been mixed success with tubestock planting over previous years due to variable weather patterns and significant dry periods followed by heavy rainfall. In order to better manage tubestock growth and the success rate with planting, a nursery for tubestock has been constructed within the Quarry Site. It is expected that tubestock grown in the nursery will be planted during appropriate weather conditions and when the plants are sufficiently grown to better withstand variable conditions.

APPENDIX 1

Project Approval PA_06_0193 (MOD – 2_ April 2019)

Project Approval

Section 75J of the *Environmental Planning & Assessment Act 1979*

The Land and Environment Court of New South Wales approves the project application referred to in Schedule 1, subject to the conditions in Schedules 2 to 5.

These conditions are required to:

- prevent, minimise, and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the on-going environmental management of the project.

Sydney

2012

SCHEDULE 1

Application Number:	06_0193
Proponent:	Hanson Construction Materials Pty Limited
Approval Authority:	Land and Environment Court of New South Wales
Land:	Lots 3, 4 and 5 DP854608 Lots 110 and 111 DP852503
Project:	East Guyong Quarry Project

December 2012 modification in red type

April 2019 modification in blue type

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DEFINITIONS

AEDT	Australian Eastern Daylight Time
AEST	Australian Eastern Standard Time
Annual Review	The annual review of operations as required under Condition 3 of Schedule 5
BCA	Building Code of Australia
Calendar year	A period of 12 months from 1 January to 31 December
CCC	Community Consultative Committee
Conditions of this approval	Conditions contained in schedules 2 to 5 inclusive
Construction activities	Physical activities required to be completed prior to commencement of quarrying operations, including construction of the processing plant, access road, sediment dam and work pad
Council	Cabonne Shire Council
Day	The period from 7 am to 6 pm
Department	NSW Department of Planning and Environment
DoI L&W	Department of Industry – Lands and Water Division
DRG	Division of Resources and Geoscience within the Department
EA	Environmental Assessment titled <i>Environmental Assessment Report September 2009: East Guyong Quarry NSW</i> (3 volumes), dated September 2009, including the Proponent's Response to Submissions and Preferred Project Report
EA (MOD 1)	Environmental Assessment titled <i>East Guyong Quarry- Section 75W Planning Assessment Report</i> , dated November 2012
EA (MOD 2)	The modification application titled <i>East Guyong Quarry Modification 2 Environmental Assessment</i> , dated September 2018 and prepared for Hanson Construction Materials Pty Limited by Umwelt, and the Response to Submissions Report titled <i>Response to Submissions East Guyong Quarry Modification 2</i> , dated November 2018 and prepared by Umwelt and, and <i>East Guyong Quarry Modification 2 Biodiversity Assessment Report</i> , dated December 2018 and prepared by Umwelt, and additional information dated 11 and 23 January 2019 and provided by Umwelt
Environment	Includes all aspects of the surroundings of humans, whether affecting any human as an individual or in his or her social groupings
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
EPL	Environment Protection Licence issued by EPA under the <i>Protection of the Environment Operations Act 1997</i>
Evening	The period from 6 pm to 10 pm
Feasible	Means what is possible and practical in the circumstances
Incident	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
Laden trucks	Trucks transporting quarry products from the site
Land	Has the same meaning as the definition of the term in section 1.4 the EP&A Act, except for where the term is used in the noise and air quality conditions in Schedule 3 of this approval where it is defined to mean the whole of a lot, or contiguous lots owned by the same landowner, in a current plan registered at the Land Titles Office at the date of this approval
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 approval or any other statutory approval
Minister	NSW Minister for Planning or delegate
Modification 2	The modification to the development as described in EA (MOD 2)
OEH	NSW Office of Environment and Heritage
Preferred Project Report	The Proponent's Preferred Project Report titled <i>Guyong Quarry – Preferred Project Report, East Guyong Quarry NSW</i> , dated May 2010
Privately-owned land	Land that is not owned by a public agency or a quarry company (or its subsidiary)
Project	The development as described the documents listed in condition 2 of Schedule 2
Proponent	Hanson Construction Materials Pty Limited, or its successors in title
Public Infrastructure	Linear and related infrastructure that provides services to the general public, such as roads, railways, water supply, gas supply, drainage, sewerage,

Quarrying Operations	telephony, telecommunications etc Includes all extraction, processing, and related transportation activities carried out on site
Resources Regulator	NSW Resources Regulator
Response to Submissions	The Proponent's response to issues raised in submissions titled <i>Detailed Response to Public Exhibition Submissions, East Guyong Quarry NSW</i> , dated March 2010
RMS	Roads and Maritime Service
Secretary	Planning Secretary under the EP&A Act or nominee
Site	The land referred to in schedule 1
Statement of Commitments	The Proponent's commitments in Appendix 2
Western Boundary Visual Screen	Visual screen described in EA (MOD 2)
Visual screen described in EA (MOD 2) and shown in Figure 1 of Appendix 1	and shown in Figure 1 of Appendix 1

SCHEDULE 2 ADMINISTRATIVE CONDITIONS

Obligation to Minimise Harm to the Environment

1. In addition to meeting the specific performance measures and criteria in this approval, all reasonable and feasible measures must be implemented to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from the construction and operation of the project, and any rehabilitation required under this approval.

Terms of Approval

2. The Proponent must carry out the project generally in accordance with the:
 - (a) EA, EA (MOD 1) and EA (MOD 2);
 - (b) statement of commitments; and
 - (c) project layout in Appendix 1.

Notes:

- The layout of the project is shown on the figures in Appendix 1.
- The statement of commitments is reproduced in Appendix 2.

- 2A. The Proponent must carry out the project in accordance with the conditions of this approval.
3. Consistent with the requirements in this approval, the Secretary may make written directions to the Proponent in relation to:
 - (a) the content of any strategy, study, system, plan, program, review, audit, notification, report or correspondence submitted under or otherwise made in relation to this approval, including those that are required to be, and have been, approved by the Secretary; and
 - (b) the implementation of any actions or measures contained in any such document referred to in condition 3(a) of Schedule 2.
4. The conditions of this approval and directions of the Secretary prevail to the extent of any inconsistency, ambiguity or conflict between them and a document/s listed in condition 2(a) of Schedule 2. In the event of an inconsistency, ambiguity or conflict between any of the document/s listed in condition 2(a) of Schedule 2, the most recent document prevails to the extent of the inconsistency, ambiguity or conflict.

Limits on Approval

5. Quarrying operations may take place at the site until 31 December 2042.

Notes:

 - Under this approval, the Proponent is required to rehabilitate the site to the satisfaction of the Secretary. Consequently this approval will continue to apply in all other respects other than the right to conduct quarrying operations until the site has been rehabilitated to a satisfactory standard.
 - Any extension of quarrying operations after this time will be subject to further approval.
6. The Proponent must not transport more than 600,000 tonnes of product from the site per calendar year.
- 6A. The Proponent must not dispatch:
 - (a) more than 30 laden trucks per hour on any operating day;
 - (b) more than 160 laden trucks per day, Monday and Friday; and
 - (c) more than 60 laden trucks per day on Saturdays.

Note: Dispatch of laden trucks is also controlled by the operating hours specified in condition 6 of Schedule 3.

Structural Adequacy

7. The Proponent must ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.

Notes:

 - Under Part 6 of the EP&A Act, the Proponent is required to obtain construction and occupation certificates for the proposed building works;
 - Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.

Protection of Public Infrastructure

8. The Proponent must:

- (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the project; and
- (b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the project.

Operation of Plant and Equipment

9. The Proponent **must** ensure that all plant and equipment used at the site is:
 - (a) maintained in a proper and efficient condition; and
 - (b) operated in a proper and efficient condition.

Community Enhancement Fund

10. The Proponent **must** establish a Community Enhancement Fund of a minimum of \$25,000 and implement expenditure from the fund to the satisfaction of the **Secretary**. Proposals for expenditure from the fund must be prepared by the Proponent in consultation with Council and the CCC, and be submitted to the **Secretary** for approval within 6 months of the date of this approval.

Staging, Combining and Updating Strategies, Plans or Programs

11. With the approval of the Secretary, the Proponent may:
 - (a) prepare and submit any strategy, plan or program required by this approval on a staged basis (if a clear description is provided as to the specific stage and scope of the project to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy, plan or program);
 - (b) combine any strategy, plan or program required by this approval (if a clear relationship is demonstrated between the strategies, plans or programs that are proposed to be combined); and
 - (c) update any strategy, plan or program required by this approval (to ensure the strategies, plans and programs required under this approval are updated on a regular basis and incorporate additional measures or amendments to improve the environmental performance of the project).
12. If the Secretary agrees, a strategy, plan or program may be staged or updated without consultation being undertaken with all parties required to be consulted in the relevant condition in this approval.

Application of Existing Strategies Plans or Programs

13. The Proponent must continue to apply existing management strategies, plans or monitoring programs approved prior to the approval of Modification 2, until the approval of a similar plan, strategy or program following the approval of Modification 2.

Evidence of Consultation

14. Where conditions of this approval require consultation with an identified party, the Proponent must:
 - (a) consult with the relevant party prior to submitting the subject document; and
 - (b) provide details of the consultation undertaken including:
 - (i) the outcome of that consultation, matters resolved and unresolved; and
 - (ii) details of any disagreement remaining between the party consulted and the Proponent and how the Proponent has addressed the matters not resolved.

Compliance

15. The Proponent must ensure that all of its employees, contractors (and their sub-contractors) are made aware of, and are instructed to comply with, the conditions of this approval relevant to activities they carry out in respect of the project.

Applicability of Guidelines

16. References in the conditions of this approval to any guideline, protocol, Australian Standard or policy are to such guidelines, protocols, Standards or policies in the form they are in as at the date of this approval.
17. However, consistent with the conditions of this approval and without altering any limits or criteria in this approval, the Secretary may, when issuing directions under this approval in respect of ongoing monitoring and management obligations, require compliance with an updated or revised version of such a guideline, protocol, Standard or policy, or a replacement of them.

SCHEDULE 3 ENVIRONMENTAL PERFORMANCE CONDITIONS

NATURALLY-OCCURRING ASBESTOS

Asbestos Mapping

1. The Proponent **must** undertake further investigations to map the extent of the asbestos mineralisation within the project area to the satisfaction of the **Secretary**. This investigation must:
 - (a) be undertaken in consultation with DRE;
 - (b) be completed by a suitably qualified geologist, whose appointment has been approved by the **Secretary**; and
 - (c) be submitted to the **Secretary** for approval prior to any earthworks occurring on site.

The Proponent **must** make the results of the investigation publicly available either on its website or by another method as agreed to by the **Secretary**.

Fencing and Signage

2. The Proponent **must** install appropriate fencing and warning signage around all surface outcrops of asbestos minerals within the project area to prevent access by persons, to the satisfaction of the **Secretary**.

Asbestos Impact Assessment Criteria

3. The Proponent **must** ensure that any asbestos fibres generated at the site do not exceed the impact assessment criterion in Table 1.

Table 1: Asbestos impact assessment criterion

Measurement	Limit
Asbestos Fibres/ml of air	0.01

Asbestos Management Plan

4. The Proponent **must** prepare an Asbestos Management Plan for the project to the satisfaction of the **Secretary**. This plan must:
 - (a) be prepared by a suitably independent and qualified expert/s;
 - (b) be submitted to the **Secretary** for approval within 3 months of approval of Modification 2;
 - (c) be prepared in consultation with the Resources Regulator;
 - (d) include a description of the measures and controls that would be implemented to minimise exposure risks and manage asbestos within the project area;
 - (e) include an asbestos monitoring protocol for evaluating compliance with the asbestos impact assessment criterion in Table 1 that describes daily, weekly and monthly testing protocols;
 - (f) include a protocol for the notification of monitoring results;
 - (g) include a protocol for the investigation, notification and mitigation of identified exceedances of the assessment criterion; and
 - (h) include a protocol to respond to incidents of human (personnel, neighbours or others) exposure to asbestos.

The Proponent **must** implement the Asbestos Management Plan as approved by the **Secretary**.

NOISE

Impact Assessment Criteria

5. The Proponent **must** ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 2.

Table 2: Noise impact assessment criteria dB(A) L_{Aeq} (15min)

Location	Day	Evening	Night
"Hartley Cottage"	35	35	35
"Cadira Vale"	35	35	35
"Lilactime"	35	35	35
"Fairview"	36	35	35

All other privately owned land	35	35	35
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Notes:

- To interpret the locations referred to Table 1, see Figure 3 in Appendix 1.
- Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.
- The noise limits do not apply if the Proponent has an agreement with the relevant owner/s of these residences/land to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

Operating Hours

6. The Proponent **must** comply with the operating hours in Table 3.

Table 3: Operating hours

Activity	Day	Time
All quarrying operations. Transportation off-site	Monday – Friday during AEST (except Public Holidays)	6.00 am to 6.00 pm
	Monday – Friday during AEDT (except Public Holidays)	6.00 am to 8.00 pm
	Saturdays	7.00 am to 1.00 pm
	Sundays and Public Holidays	No activities

However, the Proponent may undertake:

- transportation activities on and off-site outside of these hours (but only between hours up to and including 5.00 am and 10.00 pm, Monday to Saturday), if the Proponent has negotiated agreements to this effect with the owners of the following residences (whilst privately-owned) "Fairview", "Lilac Time", "Cadira Vale", "R1", "Hartley Cottage", "Quinton" and "Wheatfields", as shown in Figure 3 of Appendix 1, and the Proponent has advised the Department in writing of the terms of these agreements; and
- maintenance activities at any time provided that the activities are not audible at any privately-owned residence.

Note: This condition does not apply to delivery of material if that delivery is required by police or other authorities for safety reasons, and/or the operation or personnel or equipment are endangered. In such circumstances, notification is to be provided to EPA and the affected residents as soon as possible, or within a reasonable period in the case of emergency.

Noise Management

7. The Proponent **must** prepare a Noise Management Plan for the project to the satisfaction of the [Secretary](#). This plan must:
- be prepared in consultation with EPA, and be submitted to the [Secretary](#) for approval prior to the commencement of construction activities;
 - include:
 - a description of the measures that would be implemented to minimise noise emissions from the project, with particular focus on:
 - quarrying operations within 500 metres of residences on privately-owned land;
 - transportation activities; and
 - continual improvement of noise performance;
 - a noise monitoring protocol for evaluating compliance with the relevant noise limits in this approval;
 - a protocol for the investigation, notification and mitigation of identified exceedances of the relevant noise limits; and
 - a continual improvement program for investigating, implementing and reporting on reasonable and feasible measures to reduce noise generated by the project.

[The Proponent must implement the Noise Management Plan as approved by the Secretary.](#)

BLASTING AND VIBRATION

Airblast Overpressure Limits

8. The Proponent **must** ensure that the airblast overpressure level from blasting at the project does not exceed the criteria in Table 4 at any residence on privately-owned land.

Table 4: Airblast overpressure impact assessment criteria

Airblast overpressure level (dB(Lin Peak))	Allowable exceedance
115	5% of the total number of blasts in a 12 month period
120	0%

Ground Vibration Impact Assessment Criteria

9. The Proponent [must](#) ensure that the ground vibration level from blasting at the project does not exceed the levels in Table 5 at any residence on privately-owned land.

Table 5: Ground vibration impact assessment criteria

Peak particle velocity (mm/s)	Allowable exceedance
5	5% of the total number of blasts in a 12 month period
10	0%

Blasting Hours and Frequency

10. The Proponent [must](#) carry out blasting on site only between 9.00 am and 3.00 pm Monday to Friday. No blasting is allowed on Saturdays, Sundays and Public Holidays.
11. The Proponent may carry out on the site a maximum of:
- 2 blasts a day; and
 - 5 blasts a week, averaged over a calendar year.

Operating Conditions

12. During quarrying operations on site, the Proponent [must](#) implement best blasting practice to:
- conduct blasting operations in accordance with *AS 2187.2 – Explosive Storage, Transport and Use*;
 - minimise fly-rock and dust and fume emissions from blasting;
 - protect travellers on the Mitchell Highway
 - protect the safety of people and livestock and the serviceability of private property and public infrastructure;
- to the satisfaction of the [Secretary](#).

Blast Management Plan

13. The Proponent [must](#) prepare a Blast Management Plan for the project to the satisfaction of the [Secretary](#). This plan must:
- be submitted to the [Secretary](#) for approval prior to the commencement of blasting activities; and
 - include:
 - a Blast Monitoring Program; and
 - measures to implement the requirements of condition 12.

[The Proponent must implement the Blast Management Plan as approved by the Secretary.](#)

Blast Monitoring Program

14. The Proponent [must](#) prepare a Blast Monitoring Program for the project to the satisfaction of the [Secretary](#). This program must:
- be submitted to the Director General for approval prior to the commencement of blasting activities; and
 - include a protocol for evaluating blasting impacts on, and demonstrating compliance with, the blasting criteria in this approval for all privately-owned residences and other structures.

[The Proponent must implement the Blast Monitoring Plan as approved by the Secretary.](#)

Public Notice

15. The Proponent [must](#):

- (a) operate a blasting hotline and advertise the hotline number in a local newspaper at least twice a year, or operate an alternate system agreed to by the [Secretary](#), to enable the public to get up-to-date information on the blasting schedule;
 - (b) publish an up-to-date blasting schedule on its website; and
 - (c) notify the landowner/occupier of any residence within 2 kilometres of the site about the blasting schedule, blasting hotline and its website,
- to the satisfaction of the [Secretary](#).

Property Inspections

16. At least 2 months prior to the commencement of blasting operations at the quarry, the Proponent [must](#) advise the owners of privately-owned land within 2 kilometres of the proposed quarry, that they are entitled to a structural property inspection to establish the baseline condition of buildings and other structures on their property.

If the Proponent receives a written request for a structural property inspection from any such landowner, the Proponent [must](#):

- within 2 months of receiving this request, commission a suitably qualified, experienced and independent person, whose appointment has been approved by the [Secretary](#), to inspect the condition of any building or structure on the land, and recommend measures to mitigate any potential blasting impacts; and
- give the landowner a copy of the property inspection report.

Property Investigations

17. If any landowner of privately-owned land within 2 kilometres of blasting operations, or any other landowner nominated by the [Secretary](#), claims that buildings and/or other structures on his/her land have been damaged as a result of blasting at the project after the date of this approval, the Proponent [must](#) within 2 months of receiving this claim:
- (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the [Secretary](#), to investigate the claim; and
 - (b) give the landowner a copy of the property investigation report.

If the independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent [must](#) repair the damage to the satisfaction of the [Secretary](#).

If the Proponent or landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the [Secretary](#) for resolution.

AIR QUALITY

Impact Assessment Criteria

18. The Proponent [must](#) ensure that the dust emissions generated by the project do not cause additional exceedances of the criteria listed in Tables 6, 7 and 8 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.

Table 6: Long-term criteria for particulate matter

<i>Pollutant</i>	<i>Averaging period</i>	<i>Criterion</i>
Particulate matter < 10 µm (PM ₁₀)	Annual	^{a, c} 25 µg/m ³
Particulate matter < 2.5 µm (PM _{2.5})	Annual	^{a, c} 8 µg/m ³
Total suspended particulate (TSP) matter	Annual	^{a, c} 90 µg/m ³

Table 7: Short-term criterion for particulate matter

<i>Pollutant</i>	<i>Averaging period</i>	<i>Criterion</i>
Particulate matter < 10 µm (PM ₁₀)	24 hour	^b 50 µg/m ³
Particulate matter < 2.5 µm (PM _{2.5})	24 hour	^b 25 µg/m ³

Table 8: Long-term criteria for deposited dust

<i>Pollutant</i>	<i>Averaging period</i>	<i>Criterion</i>	
^d Deposited dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month

Notes:

^a *Total impact (i.e. incremental increase in concentrations due to the project plus background concentrations due to all other sources).*

^b *Incremental impact (i.e. incremental increase in concentrations due to the project on its own).*

^c *Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents or any other activity agreed by the Secretary.*

^d *Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method.*

Operating Conditions

19. The Proponent **must** ensure any visible air pollution generated by the project is assessed regularly, and that quarrying operations are relocated, modified, and/or stopped as required to minimise air quality impacts on privately-owned land, to the satisfaction of the **Secretary**.

Air Quality Monitoring

20. The Proponent **must** prepare an Air Quality Monitoring Program for the project to the satisfaction of the **Secretary**. This program must:
- (a) be prepared in consultation with EPA, and be submitted to the **Secretary** for approval prior to the commencement of construction activities; and
 - (b) include details of how the air quality performance of the project will be monitored, and include a protocol for evaluating compliance with the relevant air quality criteria in this approval.

The Proponent must implement the Air Quality Monitoring Plan as approved by the Secretary.

METEOROLOGICAL MONITORING

21. During the life of the project, the Proponent **must** ensure that there is a suitable meteorological station in the vicinity of the site that:
- (a) complies with the requirements in the Approved Methods for Sampling and Analysis of Air Pollutants in New South Wales (DEC, 2007); and
 - (b) is capable of measuring meteorological conditions in accordance with the NSW Industrial Noise Policy (EPA, 2000).

SOIL AND WATER

Water Supply

22. The Proponent **must** ensure that it has sufficient water for all stages of the project, and if necessary, adjust the scale of operations to match its water supply.

Pollution of Waters

23. Except as may be expressly provided for by an EPL, the Proponent **must** comply with section 120 of the *Protection of the Environment Operations Act 1997* during the carrying out of the project.

Wastewater Treatment

24. The Proponent **must** manage on-site sewage to the satisfaction of Council and EPA. The facility must comply with the requirements of the *Environment and Health Protection Guidelines – On-site Sewage Management for Single Households (1998)*, or most recent version of the relevant guidelines.

Soil and Water Management

25. The Proponent **must** prepare a Soil and Water Management Plan for the project to the satisfaction of the **Secretary**. This plan must:
- (a) be prepared in consultation with EPA and **DoI L&W**, and be submitted to the **Secretary** for approval prior to the commencement of construction activities; and
 - (b) include a:
 - Site Water Balance;
 - Erosion and Sediment Control Plan;
 - Surface Water Monitoring Program; and
 - Ground Water Monitoring Program.

The Proponent must implement the Soil and Water Management Plan as approved by the Secretary.

Note: The Department accepts that the initial Soil and Water Management Plan may not include a detailed Site Water Balance. However, the detailed Site Water Balance must be approved prior to the commencement of any processing activities.

26. The Site Water Balance must:
 - (a) include details of:
 - sources and security of water supply;
 - water use on site;
 - water management on site;
 - any off-site water transfers;
 - reporting procedures; and
 - (b) investigate and describe measures to minimise water use by the project.
27. The Erosion and Sediment Control Plan must:
 - (a) be consistent with the requirements of *Managing Urban Stormwater: Soils and Construction, Volume 2E Mines and Quarries*, (DECCW), or most recent version of the relevant guidelines;
 - (b) identify activities that could cause soil erosion and generate sediment;
 - (c) describe measures to minimise soil erosion and the potential for the transport of sediment off site;
 - (d) describe the location, function, and capacity of erosion and sediment control structures; and
 - (e) describe what measures would be implemented to maintain the structures over time.
28. The Surface Water Monitoring Program must include:
 - (a) baseline data on surface water quality, where available;
 - (b) surface water impact assessment criteria;
 - (c) a program to monitor surface water quality (particularly in the project's sediment dam); and
 - (d) a protocol for the investigation, notification and mitigation of identified exceedances of the surface water impact assessment criteria.
29. The Ground Water Monitoring Program must include:
 - (a) baseline data on ground water levels and quality;
 - (b) groundwater impact assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts;
 - (c) a program to monitor groundwater levels and quality; and
 - (d) a protocol for the investigation and notification of identified exceedances of the ground water impact assessment criteria.

REHABILITATION AND LANDSCAPE MANAGEMENT

Rehabilitation

30. The Proponent [must](#) progressively rehabilitate the site in a manner that is generally consistent with the final landform depicted in Figure 4 of Appendix 1, to the satisfaction of the [Secretary](#).

Biodiversity Credits Required

- 30A. Within 6 months of the approval of Modification 2, or other timeframe agreed by the Secretary, the Proponent must retire the biodiversity credits specified in Table 9 below.

Table 9: Biodiversity credit requirements

Credit Type	Credits Required
Ecosystem Credit	
PCT275 - Herbaceous White Box- Apple Box valley woodland of the NSW central western slopes	17

Note: The credits in Table 9 were calculated in accordance with Framework for Biodiversity Assessment of the NSW Biodiversity Offset Policy for Major Projects (OEH, 2014) and may need to be converted to reasonably equivalent 'biodiversity credits', within the meaning of the Biodiversity Conservation Act 2016, to facilitate retirement.

The retirement of the biodiversity credits specified in Table 9 must be carried out in accordance with the Biodiversity Offsets Scheme of the *Biodiversity Conservation Act 2016*.

Landscape Management Plan

31. Within 3 months of approval of Modification 2, the Proponent [must](#) prepare a Landscape Management Plan for the project to the satisfaction of the [Secretary](#). This plan must:
 - (a) be prepared in consultation with [OEH](#), [DoI L&W](#) and Council, and be submitted to the [Secretary](#) prior to the commencement of quarrying operations; and
 - (b) include a:
 - Rehabilitation and Biodiversity Management Plan; and
 - Long-Term Management Strategy.

The Proponent must implement the Landscape Management Plan as approved by the Secretary.

Note: The Department accepts that the initial Landscape Management Plan may not include the detailed Long-Term Management Strategy. However, a conceptual strategy must be included in the initial plan, along with a timetable for augmentation of the strategy with each subsequent review of the plan.

32. The Rehabilitation and Biodiversity Management Plan must include:
 - (a) the objectives for the site rehabilitation and site landscaping;
 - (b) a description of the short, medium, and long-term measures that would be implemented to rehabilitate and landscape the site;
 - (b1) a description of the short, medium, and long-term measures to be undertaken to:
 - (i) retire the credits in Table 9;
 - (ii) manage any remnant vegetation and fauna habitat on the site and in any offset areas;
 - (b2) a description of the measures that would be implemented to establish and maintain the Western Boundary Visual Screen to integrate with surrounding vegetation and align with Plant Community Type 275;
 - (c) detailed performance and completion criteria for biodiversity management actions, site rehabilitation and site landscaping;
 - (d) a detailed description of the measures that would be implemented over the next 3 years, including the procedures for:
 - progressively rehabilitating disturbed areas;
 - landscaping the site to minimise visual impacts;
 - protecting vegetation and soil outside the disturbance areas;
 - undertaking pre-clearance surveys;
 - salvaging and reusing material from the site for habitat enhancement;
 - managing impacts on fauna;
 - conserving and reusing topsoil;
 - controlling weeds and feral pests;
 - controlling access; and
 - bushfire management;
 - (e) a program to monitor the effectiveness of these measures, and progress against the performance and completion criteria;
 - (f) a description of the potential risks to successful rehabilitation, and a description of the contingency measures that would be implemented to mitigate these risks; and
 - (g) details of who would be responsible for monitoring, reviewing, and implementing the plan.
33. The Long-Term Management Strategy must:
 - define the objectives and criteria for quarry closure and post-extraction management;
 - investigate and/or describe options for the future use of the site;
 - describe the measures that would be implemented to minimise or manage the ongoing environmental effects of the project; and
 - describe how the performance of these measures would be monitored over time.

Rehabilitation Bond

34. Prior to commencing quarrying operations, the Proponent **must** lodge a rehabilitation bond for the project with the **Secretary**. The sum of the bond **must** be calculated at \$2.50/m² for the area to be disturbed in the first 3 years of quarrying operations, to the satisfaction of the **Secretary**.

Notes:

 - If the rehabilitation and revegetation works are completed to the satisfaction of the **Secretary**, the **Secretary** will release the rehabilitation bond.
 - If the rehabilitation and revegetation works are not completed to the satisfaction of the **Secretary**, the **Secretary** will call in all or part of the rehabilitation bond, and arrange for the satisfactory completion of the relevant works.
35. Within 3 months of each Independent Environmental Audit (see condition 8 of schedule 5), the Proponent **must** review, and if necessary revise, the sum of the rehabilitation bond to the satisfaction of the **Secretary**. This review must consider:
 - the effects of inflation;
 - the area proposed to be disturbed in the next 3 years and any changes to the total area of disturbance; and
 - the performance of the rehabilitation to date.

HERITAGE

Aboriginal Cultural Heritage Management Plan

36. The Proponent **must** prepare an Aboriginal Cultural Heritage Management Plan for the project to the satisfaction of the **Secretary**. This plan must:
 - (a) be prepared in consultation with **OEH and Registered Aboriginal Parties**, and be submitted to the **Secretary** for approval prior to any ground disturbance; and
 - (b) be prepared by suitably qualified and experienced person/s;

- (c) be submitted to the Secretary for approval within 3 months of approval of Modification 2;
- (d) include a protocol for monitoring ground disturbance associated with construction activities or quarrying operations;
- (e) describe the measures to be implemented on the site or within any offset area to:
 - (i) ensure all workers on the site receive suitable Aboriginal cultural heritage inductions prior to carrying out any activities which may cause impacts to Aboriginal objects or Aboriginal places, and that suitable records are kept of these inductions;
 - (ii) protect, monitor and manage Aboriginal objects and Aboriginal places identified (including any proposed archaeological investigations and salvage measures);
 - (iii) protect Aboriginal objects and Aboriginal places located outside the approved disturbance area from impacts of the development;
 - (iv) manage any new Aboriginal objects or Aboriginal places discovered during the life of the project;
 - (v) maintain and manage reasonable access for relevant Aboriginal stakeholders to Aboriginal objects and Aboriginal places (outside of the approved disturbance area); and
 - (vi) facilitate ongoing consultation and involvement of Registered Aboriginal Parties in the conservation and management of Aboriginal cultural heritage on the site.

The Proponent must implement the Aboriginal Cultural Heritage Management Plan as approved by the Secretary.

- 36A. If human remains are discovered on site, then all work surrounding the area must cease, and the area must be secured. The Proponent must immediately notify NSW Police and OEH, and work must not recommence in the area until authorised by NSW Police and OEH.
- 36B. If any Aboriginal object or Aboriginal place is discovered on the site:
- (a) all work in the immediate vicinity of the object or place must cease immediately;
 - (b) a 10 metre buffer area around the object or place must be cordoned off; and
 - (c) OEH must be contacted immediately.
- 36C. Work in the immediate vicinity may only recommence if:
- (a) the potential Aboriginal object or Aboriginal place is confirmed by OEH upon consultation with the Registered Aboriginal Parties not to be an Aboriginal object or Aboriginal Place; or
 - (b) the Aboriginal Cultural Heritage Management Plan is revised to include the Aboriginal object or Aboriginal place and appropriate measures in respect of it, to the satisfaction of the Secretary; or
 - (c) the Secretary is satisfied as to the measures to be implemented in respect of the Aboriginal object or Aboriginal place and makes a written direction in that regard.

TRAFFIC AND TRANSPORT

Road Haulage

37. Prior to transporting any extractive material from the site, the Proponent **must** ensure that the intersection of the site access road and the Mitchell Highway is constructed to a 'Type CHR Intersection Treatment', to the satisfaction of the RMS and the **Secretary**, or as otherwise accepted by the **Secretary**.

The road works must be constructed in accordance with the relevant RMS or AUSTROADS standards, and signposted, marked and lit in accordance with AS:1742 – Manual of Uniform Traffic Control Devices.

38. The Proponent **must** ensure that:
- (a) the site access road is sealed between the Mitchell Highway and the infrastructure area;
 - (b) shaker grids are installed at the boundary of the weighbridge and stockpile area;
 - (c) all loaded vehicles entering or leaving the site are covered;
 - (d) all loaded vehicles leaving the site are cleaned of materials that may fall on the road, before they leave the site; **and**
 - (e) take all reasonable steps to minimise traffic safety issues and disruption to local road users.

Road Safety

- 38A. Within 6 months of approval of Modification 2, the Proponent must undertake a Road Safety and Condition Audit for the project, to the satisfaction of the Secretary. This audit must:
- (a) be prepared by a suitably independent and qualified expert/s;
 - (b) be prepared in consultation with RMS;
 - (c) assess the safety, performance and condition of the site access road/ Mitchell Highway intersection based on current use and 10 year forecast SIDRA modelling; and
 - (d) identify any measures that are required to comply with relevant Austroad standards or other relevant RMS requirements.

- 38B. Within 12 months of completing the Road Safety and Condition Audit or as otherwise agreed with RMS, the Proponent must undertake and complete any road works recommended in the Audit, to the satisfaction of RMS. If there is a dispute about the implementation of these measures, then the Proponent may refer the matter to the Secretary for resolution.
- 38C. The Proponent must prepare a Traffic Management Plan for the project to the satisfaction of the Secretary. This plan must:
- (a) be prepared by suitably qualified and experienced person/s;
 - (b) be submitted to the Secretary for approval within 3 months of approval of Modification 2;
 - (b) be prepared in consultation with RMS and Council;
 - (c) include details of all transport routes and traffic types to be used for project-related traffic;
 - (d) describe the processes in place for the control of truck movements entering and exiting the site;
 - (e) include details of the measures to be implemented to minimise traffic safety issues and disruption to local road users, including minimising potential for conflict with school buses and stock movements;
 - (f) include a Drivers' Code of Conduct that includes procedures to ensure that drivers:
 - (i) adhere to posted speed limits or other required travelling speeds;
 - (ii) adhere to designated transport routes;
 - (iii) implement safe and quiet driving practices; and
 - (iv) describe the measures to be put in place to ensure compliance with the Drivers' Code of Conduct; and
 - (g) propose measures to minimise the transmission of dust and tracking of material onto the surface of public roads from vehicles exiting the site.

The Proponent must implement the Traffic Management Plan as approved by the Secretary.

Parking

39. The Proponent **must** provide sufficient parking on-site for all project-related traffic, in accordance with Council's parking codes.

VISUAL

Visual Amenity

40. The Proponent **must** minimise the visual impacts of the project to the satisfaction of the **Secretary**.
- 40A. Within 6 months of the approval of Modification 2, the Proponent must establish the Western Boundary Visual Screen, as shown in Figure 1 of Appendix 1. The Proponent must maintain the visual screen for the life of the project.

Lighting Emissions

41. The Proponent **must**:
- (a) take all practicable measures to mitigate off-site lighting impacts from the project; and
 - (b) ensure that all external lighting associated with the project complies with *Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting*, to the satisfaction of the **Secretary**.

Advertising

42. The Proponent **must** not erect or display any advertising structure(s) or signs on the site without the written approval of the **Secretary**.

Note: This does not include traffic management, safety or environmental signs.

WASTE MANAGEMENT

Waste Minimisation

43. The Proponent **must** minimise the amount of waste generated by the project to the satisfaction of the **Secretary**.

EMERGENCY AND HAZARDS MANAGEMENT

Dangerous Goods

44. The Proponent **must** ensure that the storage, handling, and transport of fuels and dangerous goods are conducted in accordance with the relevant *Australian Standards*, particularly AS1940 and AS1596, and the *Dangerous Goods Code*.

Safety

45. The Proponent **must** secure the project to ensure public safety, to the satisfaction of the Executive Director, Mineral Resources.

Bushfire Management

46. The Proponent **must**:
- (a) ensure that the project is suitably equipped to respond to any fires on-site;
 - (a1) *provide for asset protection in accordance with the relevant requirements in the [Planning for Bushfire Protection](#) (RFS, 2006) guideline; and*
 - (b) assist the rural fire service and emergency services as much as possible if there is a fire on-site.

PRODUCTION DATA

47. The Proponent **must**:
- (a) provide annual production data to **DRG** using the standard form for that purpose; and
 - (b) include a copy of this data in the Annual Review.
-

SCHEDULE 4 ADDITIONAL PROCEDURES

NOTIFICATION OF LANDOWNERS

1. Within 3 months of this approval, the Proponent **must** notify, in writing, the landowners of all residences located within one kilometre of any of the project site boundaries of their right to request monitoring in accordance with condition 3 below.
2. If the results of the monitoring required in Schedule 3 identify that the impacts generated by the project on site are greater than the relevant impact assessment criteria, and there is no negotiated agreement in place to allow the impact, then within 2 weeks of obtaining the monitoring results the Proponent **must**:
 - (a) notify the **Secretary**, the affected landowners and tenants (including tenants of quarry-owned properties) accordingly, and provide monitoring results to each of these parties until the results show that the project is complying with the relevant criteria in Schedule 3; and
 - (b) in the case of exceedances of the relevant air quality criteria, send the affected landowners and tenants (including tenants of mine-owned properties) a copy of the NSW Health fact sheet entitled *"Mine Dust and You"* (as may be updated from time to time).

INDEPENDENT REVIEW

3. If a landowner of privately-owned land considers the project to be exceeding the relevant air quality or noise impact assessment criteria in Schedule 3, then he/she may ask the **Secretary** in writing for an independent review of the impacts of the project on his/her land.

If the **Secretary** is satisfied that an independent review is warranted, the Proponent **must** within 2 months of the **Secretary's** decision:

- (a) commission a suitably qualified, experienced and independent expert, whose appointment has been approved by the **Secretary**, to:
 - consult with the landowner to determine his/her concerns;
 - conduct monitoring to determine whether the project is complying with the relevant impact assessment criteria in Schedule 3; and
 - if the project is not complying with these criteria then:
 - determine if more than one source, including the project, is responsible for the exceedance, and if so the relative share of each source towards the impact on the land;
 - identify the measures that could be implemented to ensure compliance with the relevant criteria; and
 - (b) give the **Secretary** and landowner a copy of the independent review.
4. If the independent review determines that the project is complying with the relevant impact assessment criteria in Schedule 3, then the Proponent may discontinue the independent review with the approval of the **Secretary**.

If the independent review determines that the project is not complying with the relevant impact assessment criteria in Schedule 3, and that the project is primarily responsible for this non-compliance, then the Proponent **must**:

 - (a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent expert, and conduct further monitoring until the project complies with the relevant criteria; or
 - (b) secure a written agreement with the landowner to allow exceedances of the relevant impact assessment criteria, to the satisfaction of the **Secretary**.
 5. If the independent review determines that the relevant impact assessment criteria in Schedule 3 are being exceeded, but that more than one source, including the project, is responsible for this non-compliance, then the Proponent **must**, together with the relevant sources:
 - (a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent expert, and conduct further monitoring until there is compliance with the relevant criteria; or
 - (b) secure a written agreement with the landowner and other relevant sources to allow exceedances of the relevant impact assessment criteria in schedule 3, to the satisfaction of the **Secretary**.

SCHEDULE 5
ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. The Proponent **must** prepare an Environmental Management Strategy for the project to the satisfaction of the **Secretary**. The strategy must:
 - (a) be submitted for approval to the **Secretary** prior to the commencement of construction activities;
 - (b) provide the strategic framework for environmental management of the project;
 - (c) identify the statutory approvals that apply to the project;
 - (d) **set out** the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;
 - (e) **set out** the procedures to be implemented to:
 - keep the local community and relevant agencies informed about the operation and environmental performance of the project;
 - receive, handle, respond to, and record complaints;
 - resolve any disputes that may arise during the course of the project;
 - respond to any non-compliance **and any incident**; and
 - respond to emergencies; and
 - (f) include:
 - **references to** the various strategies, plans and programs that are required under the conditions of this approval once they have been approved; and
 - a clear plan depicting all the monitoring to be carried out in relation to the project.
- The Proponent **must implement the Environmental Management Strategy as approved by the Secretary**.

Management Plan Requirements

2. The Proponent **must** ensure that the Management Plans required under this approval are prepared in accordance with any relevant guidelines, and include:
 - (a) **a summary of relevant background or baseline data**;
 - (b) a description of:
 - 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 project 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;
 - (d) a program to monitor and report on the:
 - impacts and environmental performance of the project; and
 - effectiveness of any management measures (see (c) above);
 - (e) a contingency plan to manage any unpredicted impacts and their consequences;
 - (f) a program to investigate and implement ways to improve the environmental performance of the project over time;
 - (g) a protocol for managing and reporting any:
 - incidents;
 - complaints;
 - non-compliances with statutory requirements; and
 - exceedances of the impact assessment criteria and/or performance criteria; and
 - (h) a protocol for periodic review of the plan.

*Note: At the discretion of the **Secretary**, some of these requirements may be waived where they are either not relevant or necessary.*

Annual Review

3. By 31 March 2012, and annually thereafter, the Proponent **must** review the environmental performance of the project to the satisfaction of the **Secretary**. This review must:
 - (a) describe the works (including rehabilitation) that were carried out in the previous calendar year, and the works that are proposed to be carried out over current calendar year;
 - (b) include a comprehensive review of the monitoring results and complaints records of the project over the past year, which includes a comparison of these results against:
 - the relevant statutory requirements, limits or performance measures/criteria;
 - the monitoring results of previous years; and
 - the relevant predictions in the **documents listed in condition 2(a) of Schedule 2**;

- (c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to [rectify the non-compliance and avoid reoccurrence](#);
- (d) identify any trends in the monitoring data over the life of the project;
- (e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and
- (f) describe what measures will be implemented over the next year to improve the environmental performance of the project.

Revision of Strategies, Plans & Programs

- 4. Within 3 months of:
 - (a) [the submission of an](#) annual review under condition 3 above;
 - (b) [the submission of an](#) incident report under condition 6 below;
 - (c) [the submission of an independent environmental](#) audit report under condition 8 below;
 - (d) [the approval of any modification of the conditions of this approval](#),
 the Proponent **must** review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the [Secretary](#).

Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the project.

COMMUNITY CONSULTATIVE COMMITTEE

- 5. The Proponent **must** establish a Community Consultative Committee (CCC) for the Project to the satisfaction of the [Secretary](#). This CCC must be operated in general accordance with the [Department's Community Consultative Committee Guidelines: State Significant Projects \(2016\)](#) to the satisfaction of the [Secretary](#).

Notes:

- *The CCC is an advisory committee only.*
- *In accordance with the Guidelines, the Committee should comprise an independent chair and appropriate representation from the Proponent, Council and the local community.*

REPORTING AND AUDITING

Incident Notification

- 6. The Proponent **must** immediately notify the Department and any other relevant agencies immediately after it becomes aware of an incident. The notification must be in writing to compliance@planning.nsw.gov.au and identify the project (including the project application number and name) and set out the location and nature of the incident.

Non-Compliance Notification

- 7. Within seven days of becoming aware of a non-compliance, the Proponent **must** notify the Department of the non-compliance. The notification must be in writing to compliance@planning.nsw.gov.au and identify the project (including the project application number and name), set out the condition of this approval that the development is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.

Note: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.

INDEPENDENT ENVIRONMENTAL AUDIT

- 8. By 31 December 2013, and every 3 years thereafter, unless the [Secretary](#) directs otherwise, the Proponent **must** commission and pay the full cost of an Independent Environmental Audit of the project. This audit must:
 - (a) be [led and](#) conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the [Secretary](#);
 - (b) include consultation with the relevant agencies [and the CCC](#);
 - (c) assess the environmental performance of the project and assess whether it is complying with the relevant requirements in this approval and any relevant EPL or other approval (including any assessment, plan or program required under these approvals);
 - (d) review the adequacy of strategies, plans or programs required under the abovementioned licences or approvals;
 - (e) recommend measures or actions to improve the environmental performance of the project, and/or any assessment, plan or program required under these approvals; and
 - (f) be completed within 2 months of the approval of the audit team.

Note: This audit team must be led by a suitably qualified auditor and include experts in any fields specified by the Secretary.

9. Within 6 weeks of the completing of this audit, or as otherwise agreed by the Secretary, the Proponent must submit a copy of the audit report to the Secretary and any other NSW agency that requests it, together with its response to any recommendations contained in the audit report.

ACCESS TO INFORMATION

10. Within 3 months of this approval, the Proponent must:
- (a) make copies of the following publicly available on its website:
 - the documents referred to in condition 2 of schedule 2;
 - all relevant statutory approvals for the project;
 - all approved strategies, plans and programs required under the conditions of this approval;
 - a comprehensive summary of the monitoring results for the project;
 - a complaints register, which is to be updated on a quarterly basis;
 - minutes of CCC meetings;
 - the annual reviews required under this approval (over the last 5 years);
 - any independent environmental audit of the project, and the Proponent's response to any recommendations in any audit; and
 - any other matter required by the Secretary; and
 - (b) keep this information up-to-date, to the satisfaction of the Secretary.
11. Any condition of this approval that requires the carrying out of monitoring or an environmental audit, whether directly or by way of a plan, strategy or program, is taken to be a condition requiring monitoring or an environmental audit under Division 9.4 of Part 9 of the EP&A Act. This includes conditions in respect of incident notification, reporting and response, non-compliance notification, compliance report and independent audit.
- Note: For the purposes of this condition, as set out in the EP&A Act, "monitoring" is monitoring of the development to provide data on compliance with the approval or on the environmental impact of the project, and an "environmental audit" is a periodic or particular documented evaluation of the project to provide information on compliance with the approval or the environmental management or impact of the project.*
12. Noise, blast and air quality monitoring under this approval is not required at all privately-owned residences and the use of representative monitoring locations can be used to demonstrate compliance with criteria.

APPENDIX 1 PROJECT PLANS

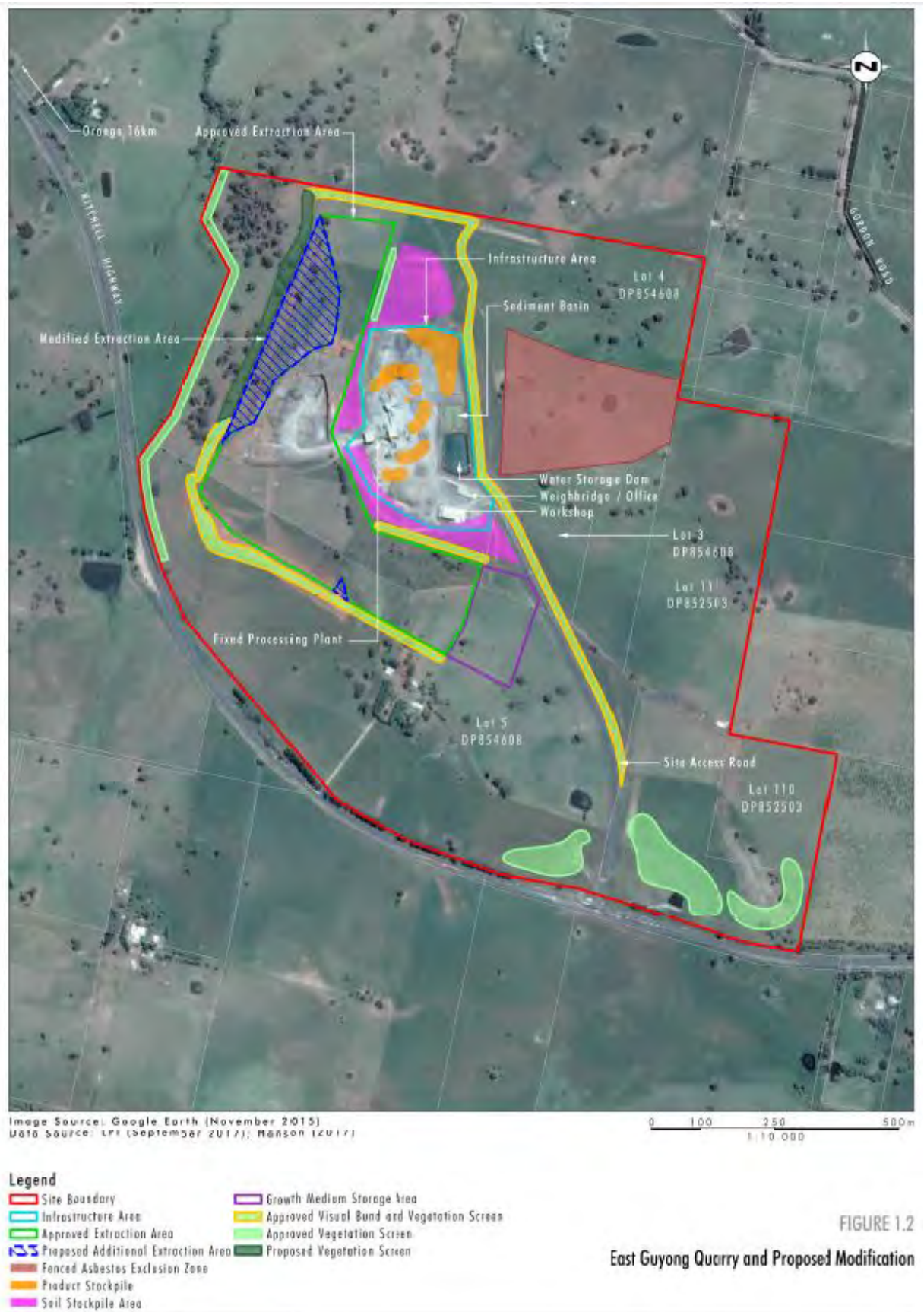


Figure 1: Project Layout

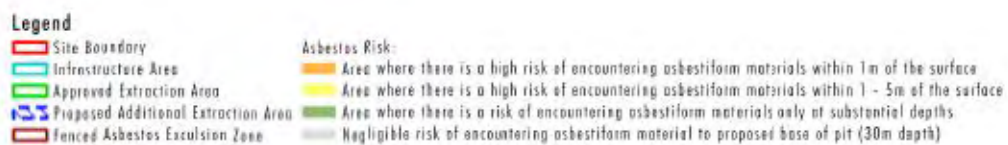


FIGURE 7.2
 Asbestos Risk

Figure 2: Asbestos risk profile

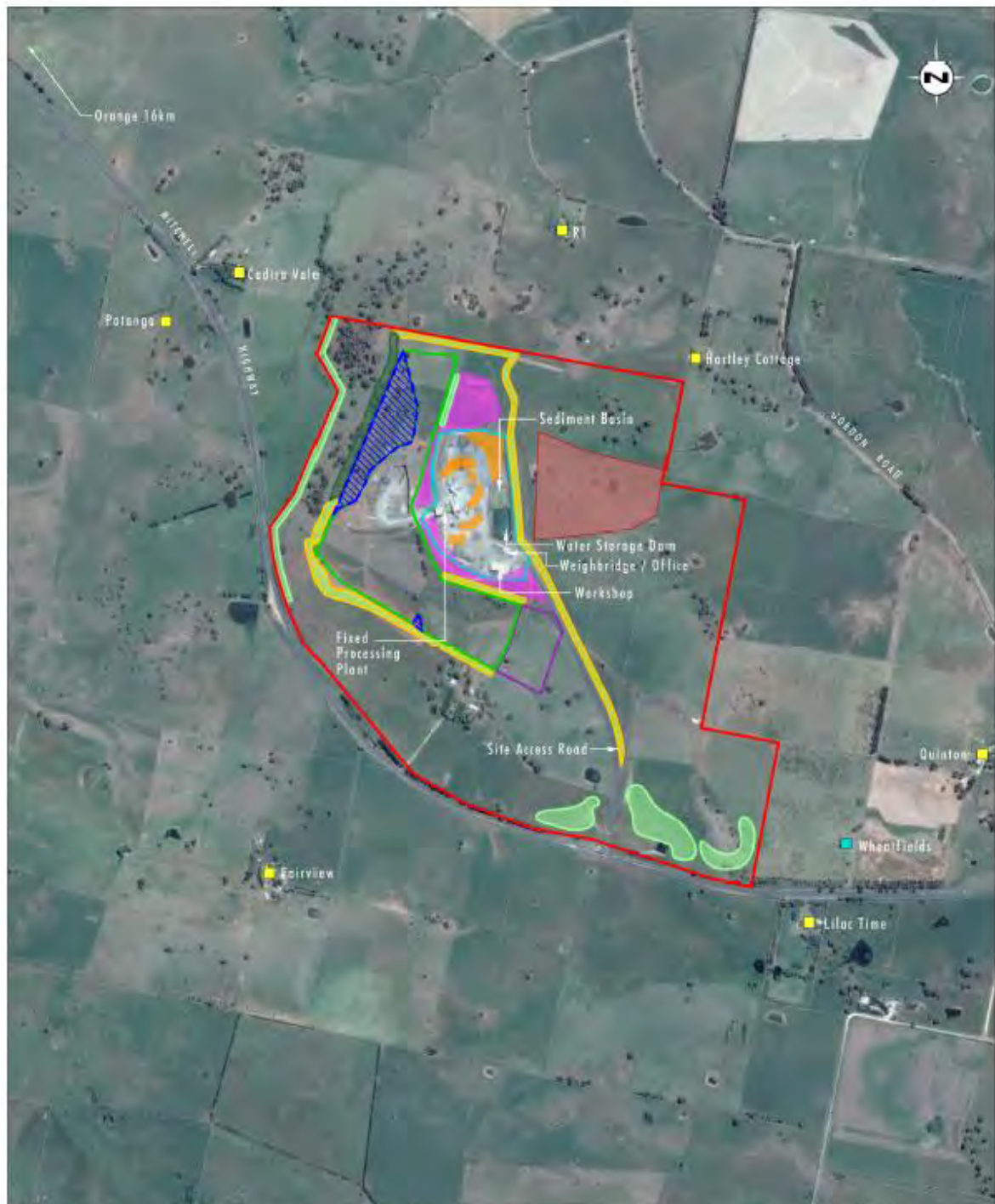


Image Source: Google Earth (November 2015)
Data Source: LPI (September 2017)

0 250 500 750m
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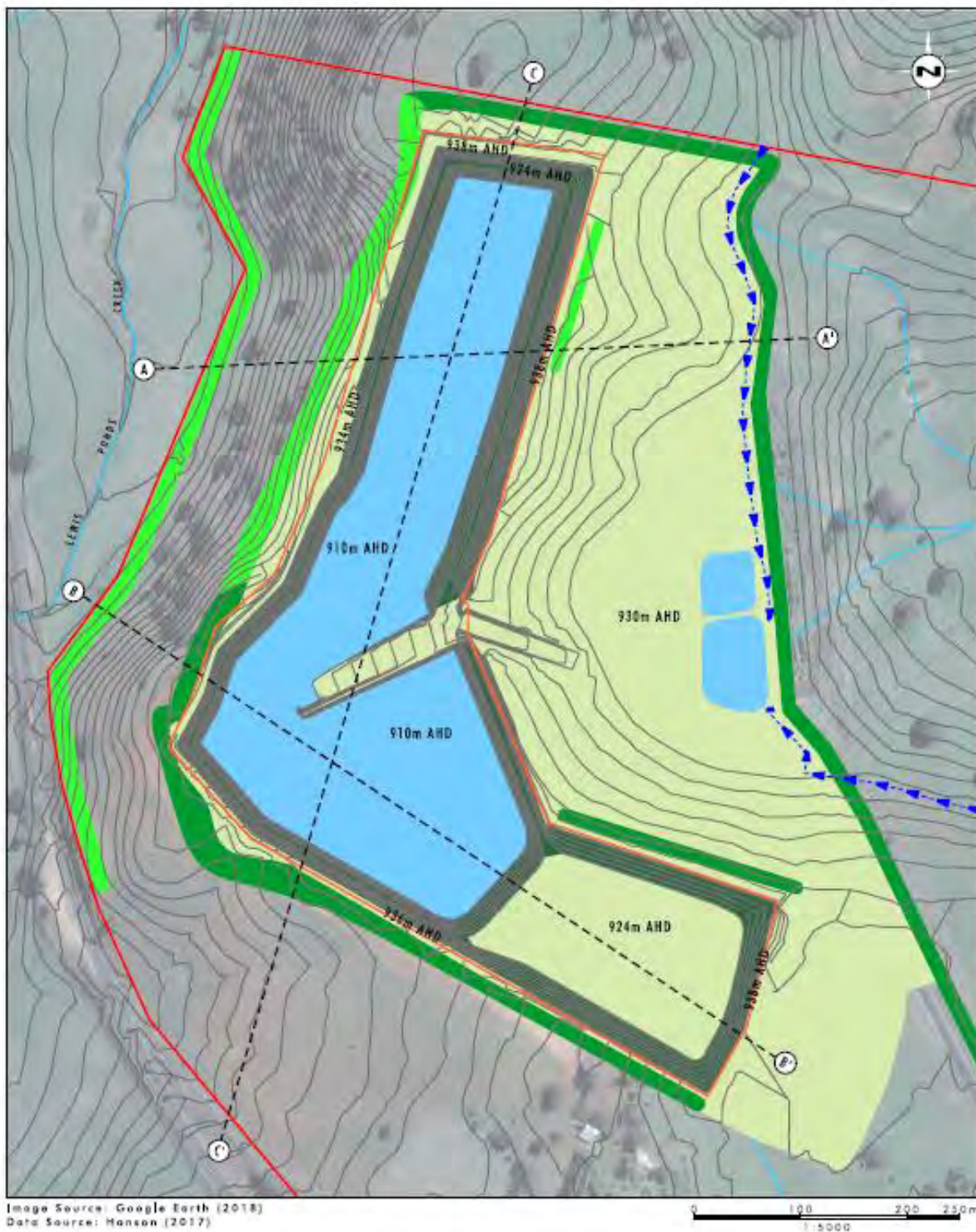
Legend

- | | |
|---|--|
| Site Boundary | Product Stockpile |
| Sensitive Receivers | Soil Stockpile Area |
| Quarry Owned Receiver | Growth Medium Storage Area |
| Infrastructure Area | Approved Visual Band and Vegetation Screen |
| Approved Extraction Area | Approved Vegetation Screen |
| Proposed Additional Extraction Area | Proposed Vegetation Screen |
| Fenced Asbestos Exclusion Zone | |

FIGURE 2.2

Sensitive Receivers and Land Use Context

Figure 3: Neighbouring residences



Legend

- Site Boundary
- Extraction Area
- Vegetation Screen
- Vegetated Visual Band
- Revegetated to Pasture
- Revegetated to Native Vegetation
- Water Storage
- Clean Drainage Flow Line
- - - Transect Location

File Name (A4): R0178131_028.dgn
20190402 15:56

FIGURE 1

Conceptual Final Landform
and Rehabilitation Plan

Figure 4: Rehabilitation Plan

APPENDIX 2 STATEMENT OF COMMITMENTS

Operational Controls	• All activities will be undertaken generally in accordance with the EAR and Preferred Project Report. • Hard rock extraction and processing activities will be as follows: - Drill and blasting only to occur during daylight hours Monday to Saturday; - Plant processing to occur during daylight hours however this may be extended from time-to-time depending on customers needs. Notice will be provided should this be the case; and - Sales and transportation activities will occur 24 hours per day as required. • Annual production will commence at 250,000 tonnes per annum and increase to a maximum of 600,000 tonnes per annum. • The quarry will be rehabilitated and the final land form will be constructed as per Figure 4 of Appendix 1. A comprehensive Rehabilitation and Decommissioning Plan will be prepared to ensure rehabilitation objectives are achieved to a reasonable extent. The Plan will include: - the rehabilitation program; - native vegetation and fauna habitat management; - feral animal control; - fire management; - weed management; - minimisation of edge effects; - stormwater control; - control of public access; and - monitoring; and funding.
Flora and Fauna	• In order to minimise the impact of vegetation clearing the proponent will commission and commence a Vegetation Clearance Management Plan, Revegetation Plan, Feral Animal Control Management Plan, and Weed Management Plan prior to commencement of quarrying activities. These plans will be developed by a suitable qualified and experienced person and take into consideration the following: - Implications of meta-population dynamics; - Implications of transitional zone dynamics; - Episodic high disturbance events; - Loss of functional role of species; - Clearing of native vegetation; and removal of dead wood and dead trees; - Bush rock removal; - Invasion of exotic perennial grasses; and - Predation by European Red Fox , Feral Cats, and Rabbits.
Heritage	• The proponent will give the Orange LALC seven days notice of their intention to commence stripping of overburden or any disturbance of the exiting ground to allow the land council sufficient time to arrange for a Sites Officer to be present. • All Hanson employees, contractors and the employees will be bound by the provisions of the National Parks and Wildlife Act 1974 as amended, which was in part designed to mitigate impacts to the indigenous archaeological record. • All Hanson employees, contractors and the employees will be instructed that in the event of any bone or stone artefacts, or discrete distributions of shell are unearthed during quarry activities, work should cease immediately in the area of the find, and the Orange LALC, and officers of the National Parks and Wildlife Service informed.
Traffic and Access	• The proponent will construct the driveway junction with the Mitchell Highway being compliant with the recommended layout depicted in Annexure B of the McLaren Traffic Report (Volume 3 of the EAR) report. It should be noted that all traffic channelisation works within the Mitchell Highway to involve line marking to AS1742 standards with delineation to allow adequate visibility in fog conditions. No concrete medians to be placed within the Mitchell Highway carriageway as raised concrete medians would be hazardous in the location. • The driveway between the property boundary and the Mitchell Highway carriageway should be sealed and extended to internally installed shaker

	grids within the site offset by a distance of 20 metres. - On-site parking will be provided to accommodate at least 20 car spaces (16 staff, 4 visitors) and 8 trucks (up to 19m in length, to allow for semi-trailers). A further area for occasional B-Double temporary parking should also be provided. An allowance for up to 2 B-Doubles is recommended each with a bay length of 25m and a width of 3.5m. - The proponent will submit a Driver Code of Practice for approval to ensure that truck drivers are made aware of the obligations of safety and environmental compliance when accessing the site and driving on the quarry property. All Hanson employee truck drivers and sub-contractors will be conditioned to adhere to the approved Driver Code of Practice. - The road from the Mitchell Highway will have access and passing lanes, allowing for trucks and other vehicles to turn safely into the quarry. Where practicable, the access road will be asphalt sealed and extended to internally installed shaker grids at the boundary of the weighbridge and stockpile area. The Preferred Project site access road will adopt a route deviating away from Naturally Occurring Asbestos (NOA) affected areas following the proposed corridor as shown on Figure 1 of the Preferred Project Report. The sealed entry road will have grades of less than 15% and will be constructed with adequate erosion and drainage control measures. A minimal amount of vegetation will be cleared during the road construction and will be used as mulch or seed beds in any re-vegetation works. The recommended driveway geometric design shown in annexure B of the Traffic Impact Assessment (Vol 3 of EAR) for Proposed Hard Rock Quarry at Mitchell Highway, Guyong.
Noise	- An Operational Noise Management Plan will be developed for the proposal and be implemented prior to extraction commencing. The plan will incorporate a noise monitoring program to monitor noise emissions and determine compliance with the project specific noise goals. The Plan will include: - Noise monitoring on site and within the community - Prompt response procedures to any community issues of concern - Refinement of on-site noise mitigation measures and quarry operating procedures where practical - Mechanism for discussion and negotiation with relevant property holders to assess concerns - Traffic Noise Management Plan will be developed and implemented for truck movements on and accessing/exiting the site.
Air Quality	- Dust suppression activities, such as spraying a suitable dust suppressant, will be undertaken on all unsealed quarry roads so that dust generation is minimised. - A weather station monitor will be installed on-site to continuously monitor weather conditions so that quarry operations can be modified to reduce dust emitting activities and appropriate mitigations taken in response to adverse weather. - An Air Quality management Plan will be developed for the proposal and be implemented prior to extraction commencing. This Plan will include air quality monitoring during construction and initial operation at the sensitive receptors as nominated in the Heggies Pty Ltd, Air Quality Impact Assessment Report of the EAR.
Groundwater	A Groundwater Management Plan will be developed prior to any extraction activities to the satisfaction of the Department in consultation with EPA. The Plan will include a groundwater monitoring program that includes weekly monitoring of groundwater level and quarterly monitoring of groundwater quality (electrical conductivity, pH, turbidity, arsenic, manganese and iron). The results of the monitoring are to be kept on-site and made available to the relevant authority.
Surface Water	- Drainage controls will consist of diversion mounds, spoon drains, and shallow trenches (gutters) to divert runoff around the infrastructure area. Final details will be designed for a storm return period of one in ten years. As the first flush of runoff from disturbed areas contains the majority of suspended solids, the 3ML sediment dam controls will be designed to contain and treat these parts of the storm. - To prevent clean water runoff (i.e. water from undisturbed areas) from entering the quarry and plant site (of disturbed areas) diversion mounds will be constructed around the infrastructure area. Any runoff from disturbed

	areas will be diverted to a sedimentation dam as shown in Figure 1 of the Preferred Project Report. All channels will be constructed to the requirements of the Soil Conservation Service and, where necessary, channels will be protected with riprap and vegetation. • To prevent soil erosion problems, only limited areas will be stripped ahead of the quarry pit development and heavy quarry traffic will be confined to constructed roads and quarry areas. Drainage channels will be constructed for all access roads and any crossings will be designed for the expected flows from upslope areas. All channels will be stabilised to prevent scouring. Rehabilitation will be carried out progressively following extractive operations to ensure a stable landform and to control soil erosion. • Runoff from the quarry and work areas will be collected by a system of diversion mounds and drains and directed to sedimentation dams for water clarification as shown in Figure 1 of the Preferred Project Report. There will be no dry weather discharge. Storage and settlement dams shown on Figure 1 of the Preferred Project Report will be constructed prior to quarrying. These dams will be designed to handle storms of duration equal to the time of concentration of the catchments. The design and construction of the sedimentation dams will be completed in accordance with the technical requirements of the Relevant Authority. • A licensed discharged point will be established at the junction of the eastern drainage line and the adjoining property. Prior to construction of the processing plant background monitoring of water quality will be undertaken on the eastern drainage line during periods of flow or, alternatively at existing dams located on the drainage line, for the purposes of determine whether there is an existing load of NOA contained within stormwater. • Used oils and greases will be collected and removed by a licensed contractor for disposal off site or on an approved disposal area. Diesel will be stored on site in an above ground fuel storage tank located in a bunded area. All fuel storage will be conducted in accordance with Australian Standards for storage of fuels (AS 1940- 2004 5.8.2, AS 3780-1994 5.7.2, AS 4452-1997).
Naturally Occurring Asbestos	• Further investigation will be undertaken to confirm the absence of NOA within the Preferred Project infrastructure area prior to commencement of construction. This investigation will be conducted under the supervision of a suitably qualified person, and the proposed methodology will be similar to that detailed in the 2009 Rangott Report. • The proponent will operate the site for the health and safety of the employees and the public by: - Keeping high risk areas fenced off to prevent unauthorised access, and clearly defining areas that prohibit unauthorised access; - Implementing a Naturally Occurring Asbestos monitoring plan; - Maintaining an induction system and safety management and reporting procedures; and - Maintaining plant and equipment in a safe condition.
Visual	• Trees will be planted to screen the plant area, as it has been previously cleared for grazing. The topsoil from this area will be stockpiled for use around the site and will be used in the rehabilitation of worked-out areas. The proposed base level for the plant site is at 924 m AHD, as shown on the plant layout plan (Figure 1 of the Preferred Project Report). • The plant site will be screened by a large continuous mound extending right around the infrastructure area and along the eastern side of the site entry road to within of 200m of the Mitchell Highway (as shown on Figure 1 of the Preferred Project Report). This large natural screen has been purposely located to avoid areas of high risk of encountering asbestiform materials at depths of less than 5m, and away from the boundaries of adjoining neighbours who will benefit from the retention of views of the valley slope.
Greenhouse Gases	• The proponent will continue to report annually the quarry operation's Greenhouse Gas emissions.
Environmental Management, Monitoring and Auditing	• The proponent will obtain an Environmental Protection Licence for the proposal in accordance with the Protection of the Environment Operations Act 1997. Three years after the commencement of the proposal, and every four years thereafter, the proponent will commission and pay the full cost of an Independent Environmental Audit of the proposal. • Within 7 days of detecting an exceedance of the limits/performance criteria in this approval or an incident causing (or threatening to cause) material

	harm to the environment, the proponent shall report the exceedance/incident to EPA and any relevant agency. The report will: - describe the date, time and nature of the exceedance/incident; - identify the cause (or likely cause) of the exceedance/incident; - describe what action has been taken to date; and - describe the proposed measures to address the exceedance/incident. • Prior to the commencement of any operations, proponent will implement, publicise and list with a telephone company a contact phone number, which will enable the general public to reach a person who can arrange appropriate response action to the enquiry. The proponent will maintain a register to record details of all enquiries received and actions undertaken in response. This record will be made available to the EPA as required.
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APPENDIX 3
(deleted)

APPENDIX 4
(deleted)

APPENDIX 2

DPIE Correspondence



Planning Services
Resource Assessments
Contact: Genevieve Seed
Phone: 9228 6489
Email: genevieve.seed@planning.nsw.gov.au

Mr Pere Riini
Hanson Construction Materials Pty Ltd
Locked Bag 5260
Parramatta NSW 2124

10 September 2015

Dear Mr Riini

East Guyong Quarry (06_0193) - extension of transportation hours

I refer to your request for an extension to the transportation hours under Schedule 3, condition 6 of Project Approval 06_0193.

The Secretary has approved your request.

This approval permits transportation activities, on and off-site, between 5am and 10pm, Monday to Saturday.

You are reminded that this approval only relates to transportation activities and not the operating hours of the quarry.

Should you have any questions about this matter, please contact Ms Genevieve Seed on 9228 6489.

Yours sincerely


Howard Reed 10.9.15
Director, Resource Assessments
as the Secretary's nominee



Hanson Construction Materials Pty Ltd
Attention: Ms Belinda Pignone
Level 18/2-12 Macquarie St
Parramatta New South Wales 2150

06/04/2021

Dear Ms Pignone

**East Guyong Quarry (MP06_0193)
Annual Review Submission Notification**

I refer to your letter submitted to the Department Planning Industry and Environment (**Department**) on 31 March 2021 in relation to the notification of the delayed submission of the East Guyong Quarry 2020 Annual Review. The Annual Review is to be submitted to the Department for the satisfaction of the Secretary by 31 March each year as required by Schedule 5 Condition 3 of Project Approval MP06_0193 (**Approval**).

The Department has carefully reviewed the letter and notes that the delayed submission is non-compliant with Schedule 5 Condition 3 of the Approval. The non-compliance has been assessed in accordance with the Department's Compliance Policy, with the Department on this occasion, determining to record the non-compliance with no further enforcement action at this stage.

In reaching this decision, the Department has considered that the delay in submitting the Annual Review was self-reported, and that the Annual Review will be submitted 2 weeks from the date of your letter. The recording of the non-compliance does not preclude the Department from taking alternative action, should it become apparent that an alternative response is more appropriate.

Please ensure the 2020 Annual Review is submitted by no later than COB Friday 16 April 2021 and includes details of this non-compliance.

If you wish to discuss the matter further, please contact Jennifer Rowe on 0242471851.

Yours sincerely

A handwritten signature in black ink, appearing to read 'K. O'Reilly'.

Katrina O'Reilly
Team Leader - Compliance
Compliance
As nominee of the Planning Secretary



Ms Belinda Pignone
Environmental Planning and Compliance Coordinator
Level 18
2-12 Macquarie Street
Parramatta, NSW, 2150

16/11/2020

Dear Ms Pignone

East Guyong Quarry Project (PA 06_0193)
Aboriginal Cultural Heritage Management Plan

I refer to the *Aboriginal Cultural Heritage Management Plan* which was submitted in accordance with Conditions 36, 36A, 36B and 36C of Schedule 3 and Condition 4(d) of Schedule 5 of the approval for the East Guyong Project (PA 06_0193).

The Department has carefully reviewed the document and is satisfied that it meets the requirements of the consent conditions and has addressed the Department's issues raised on 09 October 2020.

Accordingly, the Planning Secretary has approved the *Aboriginal Cultural Heritage Management Plan* (dated October 2020). Please ensure that the approved plan is placed on your website as soon as possible.

If you wish to discuss the matter further, please contact Nagindar Singh on 8289 6873.

Yours sincerely

A handwritten signature in black ink, appearing to read 'M Sprott'.

Matthew Sprott
Director
Resource Assessments (Coal & Quarries)

as nominee of the Planning Secretary



Ms Belinda Pignone
Environmental Planning & Compliance Coordinator
Hanson Construction Materials Pty Ltd
Level 18, 2-12 Macquarie Street
Parramatta, NSW, 2150

01/06/2020

Dear Ms Pignone

**East Guyong Quarry Project (MP 06_0193)
Landscape Management Plan**

I refer to the *Landscape Management Plan* which was submitted in accordance with Conditions 31, 32 and 33 of Schedule 3 of the approval MP06_0193 for the East Guyong Quarry Project.

The Department has carefully reviewed the document and is satisfied that it addresses the requirements of Conditions 31, 32 and 33 of Schedule 3 of MP06_0193.

Accordingly, the Planning Secretary has approved the *Landscape Management Plan* (dated May 2020).

Please ensure that a copy of the approved plan is placed on your website as soon as possible.

If you wish to discuss the matter further, please contact Nagindar Singh on 8289 6873.

Yours sincerely

A handwritten signature in black ink, appearing to read 'M Sprott'.

Matthew Sprott
Director
Resource Assessments (Coal & Quarries)

as nominee of the Planning Secretary

7 May 2021

Hanson Construction Materials Pty Ltd

ABN 90 009 679 734

Level 18

2 - 12 Macquarie Street

Parramatta NSW 2150

Tel +612 9354 2600

Fax +612 9325 2695

www.hanson.com.au

Dear Jennifer Rowe,

Re: Response to DPIE RFI – East Guyong Quarry 2020 Annual Review

As requested by the Department:

Regarding the information provided in Section 7 on Water Management, the Department notes that 2 different figures have been provided regarding the amount of water used at the Project during the reporting period, being 6.17ML (under heading Section 7 Water Management) and 23.1ML (under heading Section 7.1.2 Measured Performance).

Can you please review and clarify which water usage figure listed under Section 7 of the Annual Review is correct and amend the report to ensure the correct water usage figure is provided.

The Department requests a copy of the amended 2020 Annual Review to be submitted to the Department, via this request for further information RFI-18014346, by no later than COB Friday 7 May 2020.

Please note that the water amount noted under the heading 7 (Water Management) is referencing groundwater use. I have made changes to the Annual Review to ensure it is clear what the amount is referencing. The amount referenced within 7.1.2 (Measured Performances) is total water used at the site, which is correctly noted as 23.1ML of water.

If you have any questions or comments about the survey or the quarry in general, please do not hesitate to contact me via email at belinda.pignone@hanson.com.au.

Yours sincerely,

HANSON CONSTRUCTION MATERIALS PTY LTD



BELINDA PIGNONE

Environmental Planning and Compliance Coordinator

Pignone, Belinda (Parramatta) AUS

From: Jennifer Rowe <Jennifer.Rowe@planning.nsw.gov.au>
Sent: Monday, 2 March 2020 10:06 AM
To: Pignone, Belinda (Parramatta) AUS; Cooke, Chris (Molong) AUS
Cc: Coops, Joshua (East Guyong) AUS
Subject: RE: Hanson East Guyong

To Belinda

The Department has reviewed the information in relation to the planned production blast undertaken on Thursday 20 February 2020 at 13:58 and the detected exceedance of 116.1 dB(L) on contractor's blast monitor at the Hartley Cottage residence.

The Department considers that the exceedance was directly attributed to the blast event.

At this stage no further action is required.

The Department will review at the end of the reporting period to ensure compliance against Schedule 3 Condition 8 of the Consent 06_0193. Specifically to confirm that you are within the allowed 5% of total blasts between 115 and 120dBL for the reporting period.

Should you have any further questions please call me on the details below.

Kind regards

Jennifer Rowe

Senior Compliance Officer

Compliance | Department of Planning, Industry and Environment

T 02 4247 1851 | M 0488 988 641 | E jennifer.rowe@planning.nsw.gov.au

PO Box 5475 | Level 2/84 Crown Street Wollongong, NSW 2500

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4rrd8Limv3pJpJ_YOWLxJBtrFyUM9G2RiBTvezzpxoIovu2_rwW3vny35Ftmy2rIouXH7RD6Wff4bBaSPx4TCeXkjL0ZVvyJ28I763k1WCOpALS-R1WibLw1RVZ03FUMQeCaruSQHQN9fqIYojV4F4yeE_tHT1H-61rLR2vmshcidkF5bppSHEPwqS0VdT5xhQLnzyAoR6IzKQGcKw1lxJUWp_h2mIVTQRfIF1wYv-WHmLE_BlzgeRJ87LA/http%3A%2F%2Fwww.dpie.nsw.gov.au

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**Planning,
Industry &
Environment**

The Department of Planning, Industry and Environment acknowledges that it stands on Aboriginal land. We acknowledge the traditional custodians of the land and we show our respect for elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

If you are submitting a compliance document or request as required under the conditions of consent or approval, please note that the Department is no longer accepting lodgement via compliance@planning.nsw.gov.au.

The Department has recently upgraded the Major Projects Website to improve the timeliness and transparency of its post approval and compliance functions. As part of this upgrade, proponents are now requested to submit all post approval and compliance documents online, via the Major Projects Website. To do this, please refer to the instructions available [here](#).

From: Pignone, Belinda (Parramatta) AUS <belinda.pignone@hanson.com.au>
Sent: Friday, 28 February 2020 4:23 PM
To: Jennifer Rowe <Jennifer.Rowe@planning.nsw.gov.au>; Cooke, Chris (Molong) AUS <chris.cooke@hanson.com.au>
Cc: Coops, Joshua (East Guyong) AUS <joshua.coops@hanson.com.au>
Subject: RE: Hanson East Guyong

Hi Jennifer,

Unfortunately I am not currently linked to the East Guyong project on my Major Projects dashboard. I have submitted a request but today is the last day to submit the detailed report. I will attach the detailed report to this email as proof of complying with Schedule 5 Condition 6 (06_0193). Once my Major Projects account has been linked to East Guyong's project I will upload the relevant information via the portal then.

Kind regards,

Belinda Pignone
Environ Planning & Compliance Coordinator

T +61 2 9354 2774 | M +61 439 131 941
belinda.pignone@hanson.com.au | www.hanson.com.au

From: Jennifer Rowe [<mailto:Jennifer.Rowe@planning.nsw.gov.au>]
Sent: Monday, 24 February 2020 2:32 PM
To: Cooke, Chris (Molong) AUS <chris.cooke@hanson.com.au>
Cc: Coops, Joshua (East Guyong) AUS <joshua.coops@hanson.com.au>; Pignone, Belinda (Parramatta) AUS <belinda.pignone@hanson.com.au>
Subject: FW: Hanson East Guyong

To Chris

Thank you for the initial incident notification submitted to the Department on Friday 21 February 2020 in relation to a blast exceedance (below email).

Please ensure you provide a detailed report on the incident within 7 days as per the requirements of Schedule 5 Condition 6 for the East Guyong Quarry Project 06_0193.

Schedule 5 Condition 6 – Incident Reporting

The Proponent shall notify the Director-General and any other relevant agencies of any incident associated with the project as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Director-General and any relevant agencies with a detailed report on the incident.

Information to be provided in the detailed incident report should include the following:

- a) A summary of the incident:
 - i. Identify the development and application number
 - ii. Provide details of the incident (date, time, location, duration, a brief description of what occurred and why it is classified an incident);
 - iii. Identify how the incident was detected;

- iv. Identify when the applicant became aware of the incident;
 - v. Identify any actual and/or potential non-compliance with conditions of consent and/or management plans;
 - vi. Identify any exceedance of the limits and/or performance criteria with the consent;
 - vii. Identify whether there was actual and/or potential material harm to the environment;
 - viii. Describe what immediate steps were taken including any incident notification to relevant government agencies; and
 - ix. Details of the type, volume and concentration of any pollutants discharged.
- b) Outcomes of an incident investigation, including identification of the cause of the incident;
 - c) Details of the corrective and preventative actions that have been, or will be, implemented to address the incident and/or prevent recurrence;
 - d) Details of any communication with other stakeholders and/or government agencies regarding the incident; and
 - e) Identify a project contact for further communication regarding the incident.

Please ensure that the detailed report and any supporting documentation is submitted via the new major projects website.

If you are submitting any future compliance documents or requests as required under the conditions of consent or approval, the Department is no longer accepting lodgement via post or email.

The Department of Planning, Industry and Environment recently upgraded the Major Projects Website as part of its [commitment](#) to improve the timeliness and transparency of its post approval functions.

As part of this upgrade, proponents are now requested to submit all [post approval and compliance documents](#) online, via the Major Projects Website.

This will allow you to track the progress of the Department's review against clear benchmarks, consult directly with government agencies using the website, and receive and respond to any requests for additional information online. This will also improve the way the Department can track and report on its post approval functions.

In future, could you please submit any documents or requests as required under the conditions of consent or approval, by lodging it on the Major Projects Website.

To submit documents on the Major projects Website, you must have an account. If you have not created an account, click 'Sign in' in the top right-hand corner of the [website](#), then click 'Create account'. For detailed instructions on how to create an account, click [here](#).

Once you have an account, simply sign in and select 'Lodge Documents'. For detailed instructions on how to lodge documents, including how to consult with public authorities online, click [here](#).

If you need help creating an account or lodging your document online, please contact our support team at majorprojectssupport@planning.nsw.gov.au.

If you require any further information, please feel free to give me a call.

Kind regards,
Jennifer Rowe
Senior Compliance Officer

Compliance | Department of Planning, Industry and Environment
T 02 4247 1851 | **M** 0488 988 641 | **E** jennifer.rowe@planning.nsw.gov.au
PO Box 5475 | Level 2/84 Crown Street Wollongong, NSW 2500

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The Department of Planning, Industry and Environment acknowledges that it stands on Aboriginal land. We acknowledge the traditional custodians of the land and we show our respect for elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

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From: Cooke, Chris (Molong) AUS <chris.cooke@hanson.com.au>
Sent: Friday, 21 February 2020 11:59 AM
To: DPE PSVC Compliance Mailbox <compliance@planning.nsw.gov.au>; EPA RSD Central West Mailbox <central.west@epa.nsw.gov.au>
Cc: Coops, Joshua (East Guyong) AUS <joshua.coops@hanson.com.au>; Pignone, Belinda (Parramatta) AUS <belinda.pignone@hanson.com.au>
Subject: Hanson East Guyong

Hi,

Notification of Exceedance at one of our monitoring stations after yesterday's blast at Hartley cottage fired at 13:58 on 20th Feb .

116.1 Air over pressure
.76 Ground Vibration

We have asked the Blasting contractor Orica for a detailed report and I have notified the neighbour Sally Gordon(phone call and email) also as per our BMP part 15

Early investigation is we have ruled out any weather influences .

East Guyong Quarry

Project Approval 06_0193

Regards



Chris Cooke
Quarry Manager

T +61 2 6369 6168 | M +61 409 907 043

chris.cooke@hanson.com.au | www.hanson.com.au

APPENDIX 3

Asbestos Fibre Air Monitoring Reports



This document shall not be reproduced, except in full.
Accredited for compliance with ISO/IEC 17025 - Testing.
Accreditation No. 5450, Site No. Site No. 3402 Sydney Laboratory.
The results of the tests, calibrations and/or measurements included
in this document are traceable to Australian/national standards.
The results relate only to the samples tested and are for the sole
use by the client.

Asbestos Fibre Air Sampling & Analysis Report

Our Ref: C107605:SO2012752 East Guyong Quarry AIR 2020-03-02
Client: Hanson Construction Materials Pty Ltd
Client Address: Locked Bag 5260, Parramatta NSW 2124
Attention: Joshua Coops – Quarry Supervisor
Job Location: East Guyong Quarry, 3410 Mitchell Highway, East Guyong NSW 2798
Report Date: Friday, 20 March 2020
Analysis Date: Monday, 9 March 2020
Sampling Date: Monday, 2 March 2020
Sampling Type: Control
Sampled By: **Start:** Joshua Coops (Hanson) **Finish:** Joshua Coops (Hanson)
Location of Analysis: Base laboratory - Level 2 / 11 Khartoum Road, North Ryde NSW 2113

Licensed Asbestos Removal Contractor: N/A

Notification No: N/A

Method: Sample collection and analysis conducted in accordance with Safe Work Australia's Guidance Note on the Membrane Filter Method for the Estimation of Airborne Asbestos Fibres, 2nd Edition, 2005 [NOHSC:3003(2005)] and as described in supplementary work instruction in-house method LAB03.

Any and all services carried out by Greencap for the Client are subject to the Terms and Conditions listed on the Greencap website at <https://www.greencap.com.au/terms-conditions> and are governed by our statements of limitation available at <https://www.greencap.com.au/statements-limitation>.

Sample Filter No.	Test Type Sample Location	Sample Time Start-Finish	Sampling Rate (avg) (L/min)	Fibres/ Fields	Result(s) Fibres/mL
39577	Field Blank (25 mm)	–	–	0.0/100	–
Background asbestos fibre air monitoring throughout various locations across the site.					
39421	Location 1 – Near Southern Boundary of Site, Access Road to Residence (No.3472) off Mitchell Highway, approx. 120 metres North of South Site Boundary – On barbed wire fence	1040 – 1624	1.20	0.0/100	< 0.01
39530	Location 2 – Near Southern Boundary (SE Corner) of Site, Adjacent to New Access Road Entry (No. 3410) off Mitchell Highway, approx. 30 metres from South Site Boundary – On barbed wire fence	1056 – 1633	1.20	0.0/100	< 0.01
39498	Location 3 – Near Eastern Boundary (near SE Corner) of Site, approx. 70 metres West of Shed, Access Road – On barbed wire fence	1119 – 1637	1.20	1.0/100	< 0.01
39240	Location 4 – Near Eastern Boundary (near Centre) of Site, approx. 50 metres West of East Site Boundary – On fencing post	1126 – 1641	1.20	0.0/100	< 0.01
39480	Location 5 – Western Boundary of Proposed Quarry Pit (near Western Site Boundary) – On barbed wire fence	1145 – XXXX	1.20	0.0/100	Void
39523	Location 6 – Western Boundary (near NW Corner) of Site – On barbed wire fence	1200 – 1656	1.20	0.0/100	< 0.01

Sample Filter No.	Test Type Sample Location	Sample Time Start-Finish	Sampling Rate (avg) (L/min)	Fibres/ Fields	Result(s) Fibres/mL
39488	Location 7 – Near Northern Boundary of Site (near NE Corner Site) – On fencing post	1218 – 1703	1.20	1.00/100	< 0.01

Note: In accordance with p26 of NOHSC:3003(2005), if the fibre count is less than 10 fibres/100 graticule areas (fields), then the count is not considered significantly above that of background.

Note: Joshua Coops of Hanson Construction Materials Pty Ltd has been formally trained by Simon Day of Greencap Pty Ltd as a third party for volume measurement. Greencap Pty Ltd assume responsibility for the data collected.

Please Note: Filter Number 39480 voided due to pump fault.

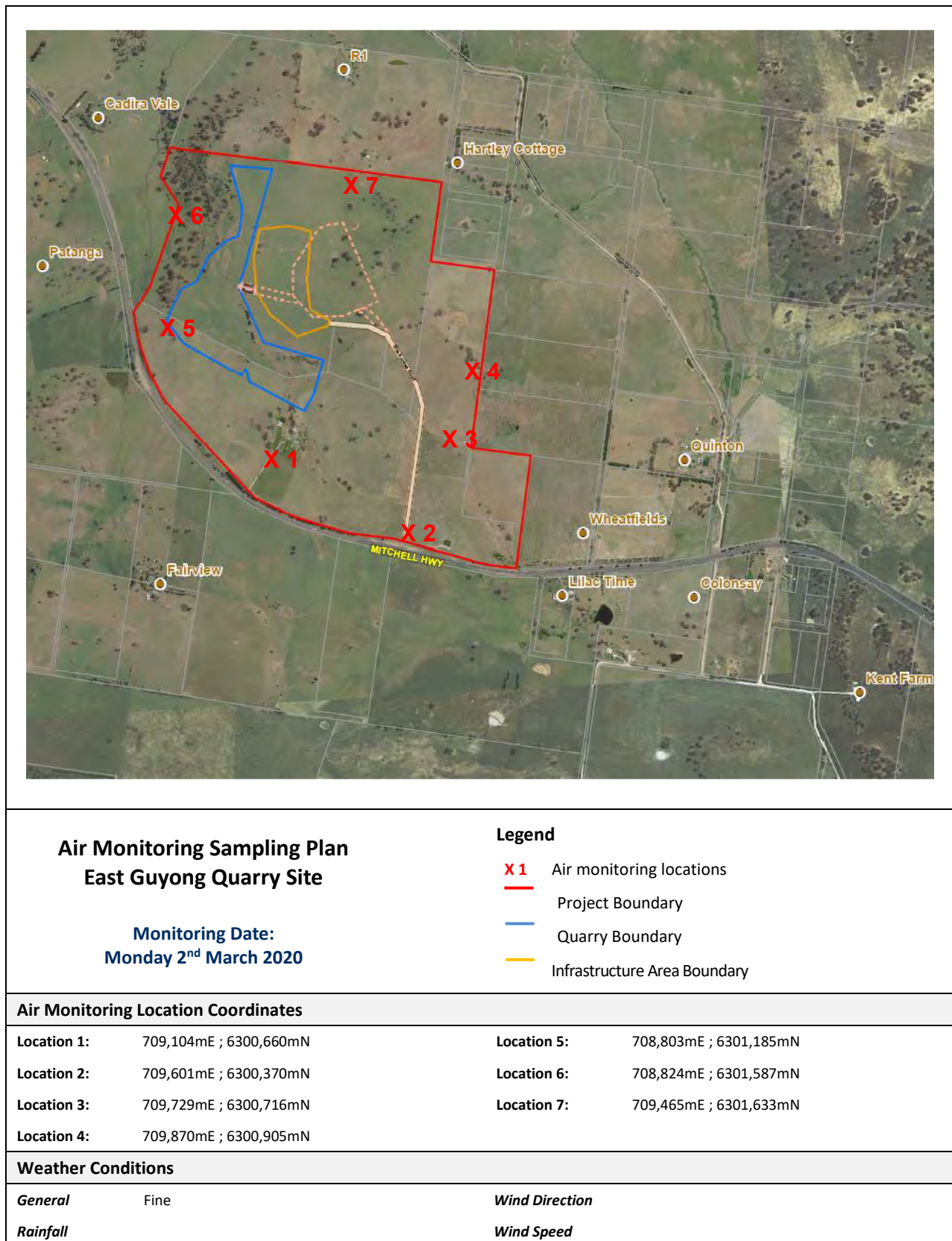


Approved Counter: Vanesa Aguasa



Approved Signatory: Amanda Chui

Figure 1 – Air Monitoring Location



Asbestos Fibre Air Sampling & Analysis Report

Our Ref: C107605:SO2013633.001 East Guyong Quarry AIR 2020-06-11
Client: Hanson Construction Materials Pty Ltd
Client Address: Locked Bag 5260, Parramatta NSW 2124
Attention: Joshua Coops – Quarry Supervisor
Job Location: East Guyong Quarry, 3410 Mitchell Highway, East Guyong NSW 2798
Report Date: Tuesday, 23 June 2020
Analysis Date: Monday, 22 June 2020
Sampling Date: Thursday, 11 June 2020
Sampling Type: Control
Sampled By: **Start:** Joshua Coops (Hanson) **Finish:** Joshua Coops (Hanson)
Location of Analysis: Base laboratory - Level 2 / 11 Khartoum Road, North Ryde NSW 2113
Licensed Asbestos Removal Contractor: N/A **Notification No:** N/A

Method: Sample collection and analysis conducted in accordance with Safe Work Australia's Guidance Note on the Membrane Filter Method for the Estimation of Airborne Asbestos Fibres, 2nd Edition, 2005 [NOHSC:3003(2005)] and as described in supplementary work instruction in-house method LAB03.

Any and all services carried out by Greencap for the Client are subject to the Terms and Conditions listed on the Greencap website at <https://www.greencap.com.au/terms-conditions> and are governed by our statements of limitation available at <https://www.greencap.com.au/statements-limitation>.

Sample Filter No.	Test Type Sample Location	Sample Time Start-Finish	Sampling Rate (avg) (L/min)	Fibres/ Fields	Result(s) Fibres/mL
59036	Field Blank (25 mm)	–	–	0.0/100	–
Background asbestos fibre air monitoring throughout various locations across the site.					
58959	Location 1 – Near Southern Boundary of Site, Access road to residence (No.3472) off Mitchell Highway, approximately 120 metres, North of South site boundary – On barbed wire fence	0842 – 1450	1.50	0.0/100	< 0.01
60776	Location 2 – Near Southern Boundary (SE Corner) of Site, Adjacent to new access road entry (No. 3410) off Mitchell Highway, approximately 30 metres from South site boundary – On barbed wire fence	0853 – 1500	1.50	0.0/100	< 0.01
60946	Location 3 – Near Eastern Boundary (near Southeast Corner) of site, approximately 70 metres West of shed, Access road – On barbed wire fence	0905 – 1502	1.50	0.0/100	< 0.01
61030	Location 4 – Near Eastern Boundary (near Centre) of site, approximately 50 metres West of East site boundary – On fencing post	0912 – 1506	1.50	0.0/100	< 0.01
60505	Location 5 – Western Boundary of proposed quarry pit (near Western Site Boundary) – On barbed wire fence	0933 – 1516	1.50	0.0/100	< 0.01
61539	Location 6 – Western Boundary (near Northwest Corner) of site – On barbed wire fence	0945 – 1523	1.50	2.0/100	< 0.01

Sample Filter No.	Test Type Sample Location	Sample Time Start-Finish	Sampling Rate (avg) (L/min)	Fibres/ Fields	Result(s) Fibres/mL
58000	Location 7 – Near Northern Boundary of Site (near Northeast corner site) – On fencing post	1002 – 1535	1.50	0.00/100	< 0.01

Note: In accordance with p26 of NOHSC:3003(2005), if the fibre count is less than 10 fibres/100 graticule areas (fields), then the count is not considered significantly above that of background.

Note: Joshua Coops of Hanson Construction Materials Pty Ltd has been formally trained by Simon Day of Greencap Pty Ltd as a third party for volume measurement. Greencap Pty Ltd assume responsibility for the data collected.

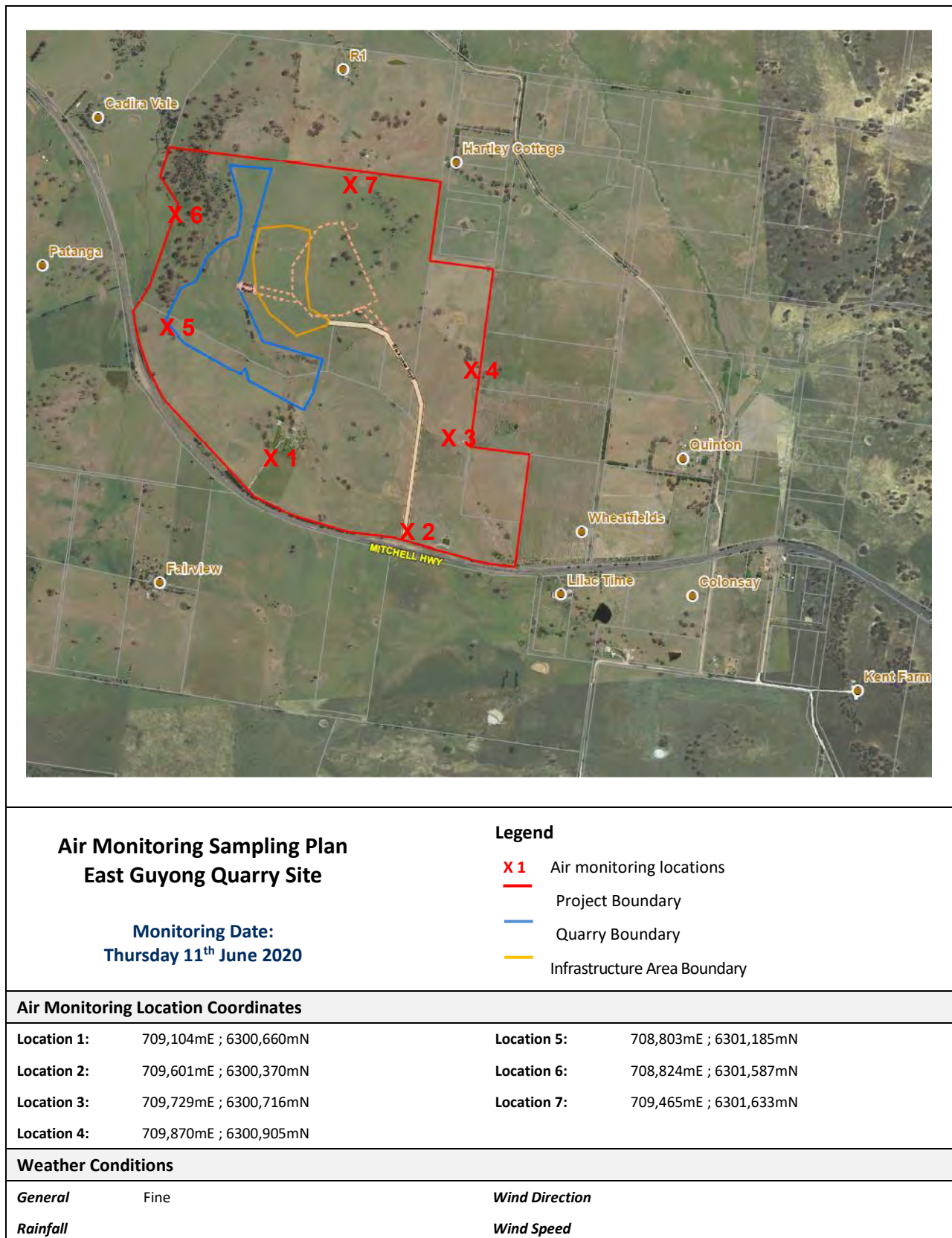


Approved Counter: Vanesa Aguasa



Approved Signatory: Amanda Chui

Figure 1 – Air Monitoring Location



Asbestos Fibre Air Sampling & Analysis Report

Our Ref: C107605:SO2014738.001 East Guyong Quarry AIR 2020-09-23
Client: Hanson Construction Materials Pty Ltd
Client Address: Locked Bag 5260, Parramatta NSW 2124
Attention: Joshua Coops – Quarry Supervisor
Job Location: East Guyong Quarry, 3410 Mitchell Highway, East Guyong NSW 2798
Report Date: Friday, 25 September 2020
Analysis Date: Friday, 25 September 2020
Sampling Date: Wednesday, 23 September 2020
Sampling Type: Control (Static)
Sampled By: **Start:** Joshua Coops (Hanson) **Finish:** Joshua Coops (Hanson)
Location of Analysis: Base laboratory - Level 2 / 11 Khartoum Road, North Ryde NSW 2113
Licensed Asbestos Removal Contractor: N/A **Notification No:** N/A

Method: Sample collection and analysis conducted in accordance with Safe Work Australia's Guidance Note on the Membrane Filter Method for the Estimation of Airborne Asbestos Fibres, 2nd Edition, 2005 [NOHSC:3003(2005)] and as described in supplementary work instruction in-house method LAB03.

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Sample Filter No.	Test Type Sample Location	Sampling Period Start-Finish	Sampling Rate (avg) (L/min)	Fibres/ Fields	Result(s) Fibres/mL
00964	Field Blank (25 mm)	–	–	0.0/100	–
Background asbestos fibre air monitoring throughout various locations across the site.					
01002	Location 1 – Near Southern Boundary of Site, Access road to residence (No.3472) off Mitchell Highway, approximately 120 metres, North of South site boundary – On barbed wire fence	0900 – 1442	1.50	2.0/100	< 0.01
00868	Location 2 – Near Southern Boundary (SE Corner) of Site, Adjacent to new access road entry (No. 3410) off Mitchell Highway, approximately 30 metres from South site boundary – On barbed wire fence	0906 – 1446	1.50	1.0/100	< 0.01
00730	Location 3 – Near Eastern Boundary (near Southeast Corner) of site, approximately 70 metres West of shed, Access road – On barbed wire fence	0911 – 1449	1.50	1.0/100	< 0.01
00932	Location 4 – Near Eastern Boundary (near Centre) of site, approximately 50 metres West of East site boundary – On fencing post	0918 – 1453	1.50	1.0/100	< 0.01
76028	Location 5 – Western Boundary of proposed quarry pit (near Western Site Boundary) – On barbed wire fence	0931 – 1503	1.50	0.0/100	< 0.01
00933	Location 6 – Western Boundary (near Northwest Corner) of site – On barbed wire fence	0943 – 1512	1.50	2.0/100	< 0.01

Sample Filter No.	Test Type Sample Location	Sampling Period Start-Finish	Sampling Rate (avg) (L/min)	Fibres/ Fields	Result(s) Fibres/mL
00865	Location 7 – Near Northern Boundary of Site (near Northeast corner site) – On fencing post	0951 – 1527	1.50	3.00/100	< 0.01

Note: In accordance with p26 of NOHSC:3003(2005), if the fibre count is less than 10 fibres/100 graticule areas (fields), then the count is not considered significantly above that of background.

Note: Joshua Coops of Hanson Construction Materials Pty Ltd has been formally trained by Simon Day of Greencap Pty Ltd as a third party for volume measurement. Greencap Pty Ltd assume responsibility for the data collected.

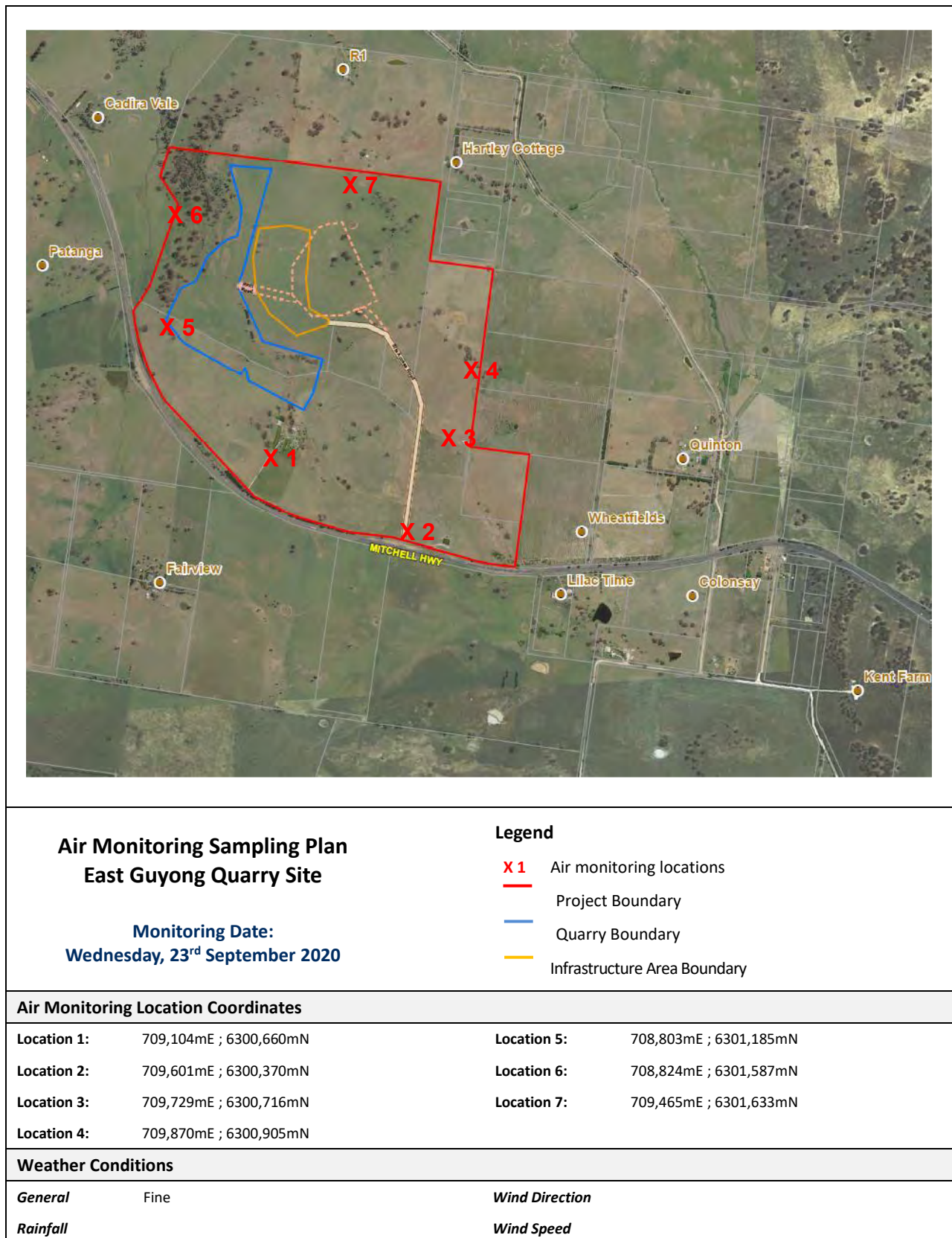


Approved Counter: Vanesa Aguasa



Approved Signatory: Amanda Chui

Figure 1 – Air Monitoring Location



Asbestos Fibre Air Sampling & Analysis Report

Our Ref: C107605:SO2015614.001_EastGuyongQuarry_AFM_20201214
Client: Hanson Construction Materials Pty Ltd
Client Address: Locked Bag 5260, Parramatta NSW 2124
Attention: Joshua Coops – Quarry Supervisor
Job Location: East Guyong Quarry, 3410 Mitchell Highway, East Guyong NSW 2798
Report Date: Wednesday, 20 January 2021
Analysis Date: Tuesday, 19 January 2021
Sampling Date: Monday, 14 December 2020
Sampling Type: Control
Sampled By: **Start:** Joshua Coops (Hanson) **Finish:** Joshua Coops (Hanson)
Location of Analysis: Base laboratory - Ground Floor, North Building, 22 Giffnock Ave, Macquarie Park NSW 2113
Licensed Asbestos Removal Contractor: N/A **Notification No:** N/A

Method: Sample collection and analysis conducted in accordance with Safe Work Australia's Guidance Note on the Membrane Filter Method for the Estimation of Airborne Asbestos Fibres, 2nd Edition, 2005 [NOHSC:3003(2005)] and as described in supplementary work instruction in-house method LAB03.

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Sample Filter No.	Test Type Sample Location	Sample Time Start-Finish	Sampling Rate (avg) (L/min)	Fibres/ Fields	Result(s) Fibres/mL
24011	Field Blank (25 mm)	–	–	1.0/100	–
Background asbestos fibre air monitoring throughout various locations across the site.					
23984	Location 1 – Near Southern Boundary of Site, Access road to residence (No.3472) off Mitchell Highway, approximately 120 metres, North of South site boundary – On barbed wire fence	0814 – 1235	1.50	1.0/100	< 0.01
23988	Location 2 – Near Southern Boundary (SE Corner) of Site, Adjacent to new access road entry (No. 3410) off Mitchell Highway, approximately 30 metres from South site boundary – On barbed wire fence	0821 – 1240	1.50	4.5/100	< 0.01
23896	Location 3 – Near Eastern Boundary (near Southeast Corner) of site, approximately 70 metres West of shed, Access road – On barbed wire fence	0828 – 1248	1.50	1.0/100	< 0.01
23800	Location 4 – Near Eastern Boundary (near Centre) of site, approximately 50 metres West of East site boundary – On fencing post	0841 – 1253	–	2.0/100	Void
24061	Location 5 – Western Boundary of proposed quarry pit (near Western Site Boundary) – On barbed wire fence	0855 – 1311	1.50	2.0/100	< 0.01
23974	Location 6 – Western Boundary (near Northwest Corner) of site – On barbed wire fence	0917 – 1324	1.50	1.0/100	< 0.01

Sample Filter No.	Test Type Sample Location	Sample Time Start-Finish	Sampling Rate (avg) (L/min)	Fibres/ Fields	Result(s) Fibres/mL
24036	Location 7 – Near Northern Boundary of Site (near Northeast corner site) – On fencing post	0934 – 1340	1.50	1.0/100	< 0.01

Note: In accordance with p26 of NOHSC:3003(2005), if the fibre count is less than 10 fibres/100 graticule areas (fields), then the count is not considered significantly above that of background.

Note: Joshua Coops of Hanson Construction Materials Pty Ltd has been formally trained by Simon Day of Greencap Pty Ltd as a third party for volume measurement. Greencap Pty Ltd assume responsibility for the data collected

Please Note: Filter Number 23800 voided due to pump fault.

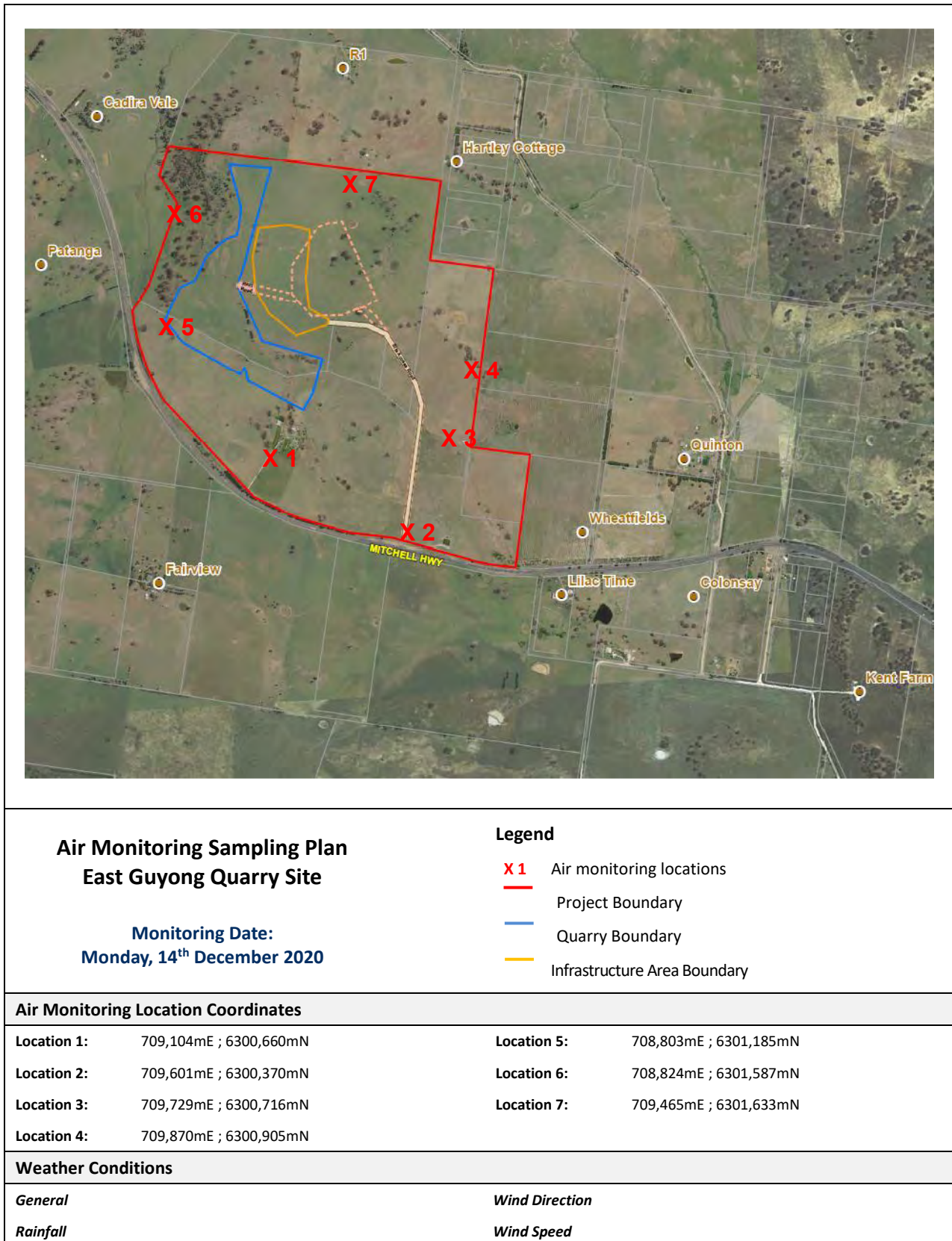


Approved Counter: Vanesa Aguasa



Approved Signatory: Simon Day
Asbestos Assessor Licence No. LAA001418

Figure 1 – Air Monitoring Location



APPENDIX 4

Noise Monitoring Reports

16 October 2020

Chris Cooke
Quarry Manager
Hanson Construction Materials Pty Ltd
Level 5, 75 George Street
Parramatta NSW 2150

Ground floor, 20 Chandos Street
St Leonards NSW 2065
PO Box 21
St Leonards NSW 1590

T 02 9493 9500
E info@emmconsulting.com.au
www.emmconsulting.com.au

Re: Quarter 1 - 2020: East Guyong Quarry noise and blast monitoring

Dear Chris,

1 Introduction

EMM Consulting Pty Ltd (EMM) has been commissioned by Hanson Construction Materials Pty Ltd (NSW) (Hanson) to complete quarterly noise monitoring for the East Guyong Quarry, as required by the site's approved Noise Management Plan. The quarry is located approximately 22 km southeast of Orange, NSW. Operator-attended noise monitoring was undertaken on 19 March 2020.

The following material was referenced as part of this assessment:

- Environment Protection Authority (EPA), *Industrial Noise Policy* (INP) 2000;
- Environment Protection Authority (EPA), *Industrial Noise Policy - Application notes* 2017;
- Environment Protection Authority (EPA), *Noise Policy for Industry* (NPfI) 2017;
- Hanson Construction Materials and R. W. Corkery & Co Pty Limited (RWC), *Noise Management Plan for the East Guyong Quarry* (NMP) – Mod 2 Revision, July 2019;
- Department of Planning and Infrastructure (DP&I), *East Guyong Quarry Project Modification (06_0193 MOD 1) approval* (PA) 2012; and
- Australian and New Zealand Environment Council (ANZEC) 1990, *Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration*.

Analysis of data from three blast events that occurred on 3 December 2019, 22 January and 20 February 2020 has also been included in this report.

Several technical terms are discussed in this report and are explained in Appendix A.

2 Methodology

2.1 Site operations

At the time of the attended noise monitoring on 19 March 2020, the quarry's activities comprised of the following:

- Dump truck and excavator operating in extraction pit;
- Sales front end loader (FEL) operating in stockpile area (980H);
- Maintenance and repairs across site machinery; and
- Heavy vehicle movements/sales.

The quarry's approved hours of operation are:

- Monday to Friday (non-daylight savings) from 6 am to 6 pm;
- Monday to Friday (daylight savings) from 6 am to 8 pm; and
- Saturdays from 7 am to 1 pm.

Material crushing and screening currently occurs on site from Monday to Thursday. This restriction to approved hours is an operational decision by the quarry and aids in the planning for maintenance and repairs.

2.2 Noise monitoring

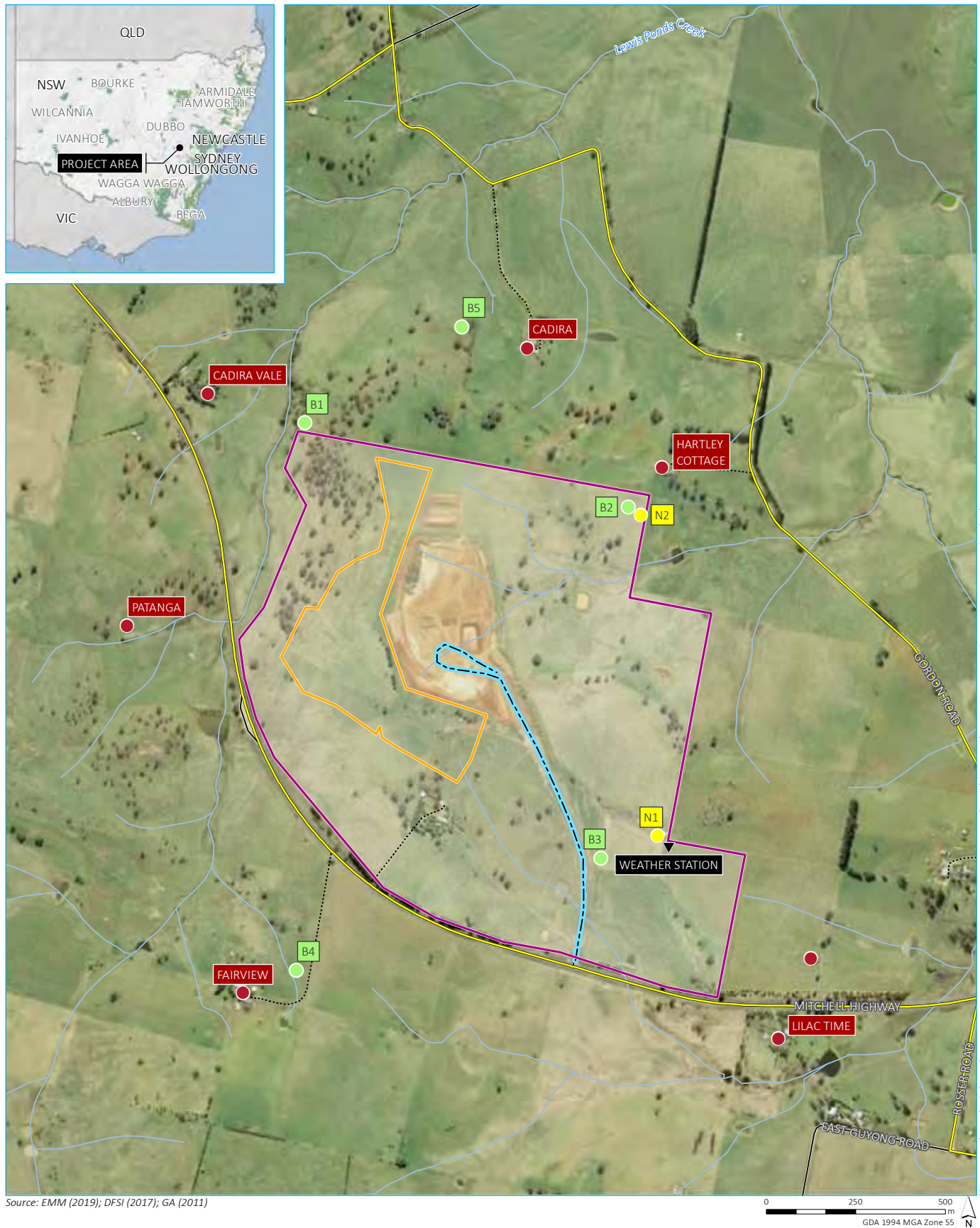
Operator-attended 15-minute noise measurements were conducted at locations N1 and N2, as shown in Figure 1, when the quarry was in full operation. The operator quantified the contribution of each significant quarry noise source where possible. Noise monitoring was conducted in general accordance with the INP and Australian Standard AS 1055-2018 *Acoustics - Description and Measurement of Environmental Noise - General Procedures*.

A Brüel & Kjær 2250 Type 1 sound analyser (s/n 3008201) was used for the noise monitoring. The sound analyser was calibrated before and after the completion of the surveys using a Svantech SV36 calibrator (s/n 86311). The instruments were within a current NATA calibration period at the time of the noise monitoring and relevant certificates are provided in Appendix B.

2.3 Assessment locations

The noise monitoring included four 15-minute operator-attended noise measurements during the daytime period on 19 March 2020 to quantify noise emissions from the quarry at locations N1 and N2. Noise monitoring was not conducted prior to 7 am as the quarry was not in operation.

Locations N1 and N2 are near the south-east and north-east boundaries of the site, respectively. Location N1 is approximately 500 m from "Wheatfields", the closest residence situated south-east of the quarry. Location N2 is approximately 150 m from "Hartley Cottage", the closest residence situated north-east of the quarry. These monitoring locations were selected to not inconvenience surrounding residents and are consistent with the approved Noise Management Plan for the East Guyong Quarry (RWC, 2019). Monitoring at these locations, rather than at the residences, also provides a better opportunity to quantify site related noise since they are closer to the operations.



KEY

- | | | |
|---|---|--|
| ● Blast monitoring location | Site boundary | Main road |
| ● Residences | Extrac on area boundary | Local road |
| ● A ended noise monitoring location | Transport route | Vehicular track |
| ▼ Weather station | | Watercourse/drainage line |

Site location and monitoring plan

East Guyong Quarry
Noise and blast monitoring
Figure 1

3 Criteria

3.1 Operational noise

Condition 3(5) of PA 06_0193 states that the noise assessment criteria are $L_{Aeq,15 \text{ minute}}$ 35 dB at any residence for all assessment periods. The exception is the "Fairview" residence which has a daytime criterion of $L_{Aeq,15 \text{ minute}}$ 36 dB. In accordance with the PA 06_0193, "Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy."

As per Condition 3(5) of PA 06_0193, to demonstrate compliance at residential locations, the noise monitoring results are to be assessed against the following (intermediate) noise criteria for monitoring locations N1 and N2:

- N1 - $L_{Aeq,15 \text{ minute}}$ 43 dB; and
- N2 - $L_{Aeq,15 \text{ minute}}$ 50 dB.

It is stated in the NMP that by satisfying criteria at these intermediate locations, quarry noise at neighbouring residences would also satisfy residential criteria. This assumes the presence of soil and product stockpiles, bunding and intervening topography between the site and surrounding residences, which provide some degree of attenuation of site noise.

Further to the above, section 11.1.3 of the INP identifies that a development is deemed to be in non-compliance if the monitored noise levels from the development are more than 2 dB above the statutory limit.

3.2 Low frequency noise criteria

Section 11.2.3 of the NMP states that modification factors in Section 4 of the INP (EPA 2000) should be applied to the measured noise levels where applicable. The INP application notes state that Section 4 of the INP has been withdrawn and the modifying factor adjustments outlined in Fact Sheet C of the NPfI are to be used when assessing the characteristics of a noise source. Fact sheet C of the NPfI (EPA 2017) states that modification factor corrections shall be applied to the measured noise levels where relevant.

Fact sheet C of the NPfI (EPA 2017) provides guidelines for applying modifying factor corrections to account for annoying noise characteristics, such as tonal and low frequency noise emissions. The NPfI specifies that for low frequency noise, a difference of 15 dB or more between site 'C-weighted' and site 'A-weighted' noise emission levels identifies the potential for an unbalanced spectrum and potential increased annoyance.

Where a difference of 15 dB or more between site 'C-weighted' and site 'A-weighted' noise emission levels is identified, the one-third octave noise levels recorded should be compared to the values in Table C2 of the NPfI (EPA 2017), which has been reproduced in Table 3.1 below.

Table 3.1 One-third octave low-frequency noise thresholds

One-third octave $L_{Zeq,15 \text{ minute}}$ threshold level													
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB (Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

The modifying factor correction to be applied where the site 'C-weighted' and site 'A-weighted' noise emission level is 15 dB or more and:

- where any of the one-third octave noise levels in Table 3.1 are exceeded by up to and including 5 dB and cannot be mitigated, a 2 dB positive adjustment to measured/predicted A-weighted levels applies for the evening/night period; or
- where any of the one-third octave noise levels in Table 3.1 are exceeded by more than 5 dB and cannot be mitigated, a 5 dB positive adjustment to measured/predicted A-weighted levels applies for the evening/night period and a 2 dB positive adjustment applies for the daytime period.

Hence, where possible throughout each survey the operator has estimated the difference between site 'C-weighted' and site 'A-weighted' noise emission levels by matching audible sounds with the response of the analyser ($L_{Ceq} - L_{Aeq}$). Where this was deemed to be 15 dB or greater, the measured one-third octave frequencies have been compared to the values in Table 3.1 to identify the relevant modifying factor correction (if applicable). This method has been applied to this assessment as presented in Section 4.

It is of note that the NPfl (EPA 2017) states that low-frequency noise corrections only apply under the standard and/or noise-enhancing (ie applicable) meteorological conditions.

3.3 Blast monitoring

Blast overpressure and vibration monitoring is managed by Hanson for all blast events. Blast overpressure and ground vibration are monitored at three locations within or at the site's boundary as well as two locations outside of the site's boundary (one south of the Mitchell Highway near the Fairview property and one north of the site near the Cadira property). Monitoring locations are situated closer to blasting locations than the residential structures (refer to Figure 2.1), and therefore overpressure and vibration levels would likely be lower at the actual residential dwellings than those measured.

Blast emissions criteria for the quarry apply at any residence on privately-owned land surrounding the site and are presented in Table 3.2.

Table 3.2 Blast overpressure and vibration criteria

Location	Airblast overpressure criteria (dB (Linear Peak))	Ground vibration criteria (mm/s (Peak velocity))	Allowable exceedance
Any privately-owned residence surrounding the site.	115	5	5% of the total number of blasts in a 12-month period
	120	10	0%

4 Results

4.1 Noise monitoring results

Noise monitoring results for locations N1 and N2 are presented in Table 4.1. Data recorded by the site's weather station (shown in Figure 2.1) was used to identify weather conditions during the monitoring period and to determine the applicability of noise limits. Wind speed and direction observations are presented in Table 4.1

Wind speed averages were equal to or above 3 m/s (at 10 m above ground) during all of the measurements at N1 and N2; hence noise limits were not applicable during all measurements.

Low frequency noise modifying factors, in accordance with fact sheet C2 of the NPfI (EPA 2017), were not applied to any measured site contribution as measured noise levels did not exceed the relevant LFN thresholds.

All quarry contributions measured at locations N1 and N2 would have satisfied the relevant noise criteria as per the NMP, had they applied. It is therefore expected that relevant criteria for surrounding residential receivers would also have been satisfied.

Based on the preceding information, noise levels from the quarry were expected to satisfy the relevant residential criteria at all assessment locations identified in Condition 3(5) of PA_0193.

Table 4.1 **Attended noise monitoring summary – 19 March 2019**

Location	Start time	Attended noise monitoring results dB					Criteria dB	Meteorological conditions ¹		Criteria Applies? (Y/N)	Exceedance	Comments
		Total measured			Site contribution			Wind speed (m/s)	Wind direction ²			
		L ₉₀	L _{Aeq}	L _{Amax}	LFN mod. factor	L _{Aeq}	L _{Aeq}					
N1	9:01am	31	37	59	Nil	≤30	43	3.0	197	N	N/A	Site audible at times including FEL and other machinery/trucks traversing (engine revs). Other sources include consistent traffic noise from the Mitchell Highway, occasional birdsong and insects.
N2	9:27am	36	42	61	Nil	≤40	50	4.3	219	N	N/A	Site audible at times including FEL, other machinery/trucks traversing (engine revs) and other maintenance work (power tools). Other sources include consistent traffic noise from the Mitchell Highway, occasional birdsong and aircraft overflights.
N2	9:44am	33	46	69	Nil	≤38	50	5.1	217	N	N/A	Site audible at times including FEL, other machinery/trucks traversing (engine revs), a light vehicle traversing and other maintenance work (power tools). Other sources include consistent traffic noise from the Mitchell Highway, occasional birdsong and aircraft overflights.
N1	10:12am	33	41	69	Nil	≤32	43	4.3	220	N	N/A	Site audible at times including FEL, other machinery/trucks traversing (engine revs) and infrequent “bangs/clangs” from maintenance work. Other sources include consistent traffic noise from the Mitchell Highway, livestock and aircraft overflights.

Notes: 1. Meteorological data was obtained from the site weather station at a height of 10 m above ground.
 2. Wind direction reported in degrees from north (0°)
 3. N/A = Not Applicable

4.2 Blast overpressure and ground vibration

Three blast events occurred at the quarry since the last quarterly noise monitoring in November 2019. The blast overpressure and vibration monitoring results were provided by Hanson and are presented in Table 4.2.

Table 4.2 Blast emissions monitoring results

Date	Monitoring location	Airblast overpressure level (dB(Linear Peak))		Ground vibration - Peak particle velocity (mm/s)	
		Measured	Criteria ²	Measured	Criteria ²
3/12/19	B1	106.5	115	0.51	5
	B2 ¹	-	115	-	5
	B3	114	115	0.63	5
	B4	103.5	115	1.02	5
	B5 ¹	-	115	-	5
22/01/2020	B1	107	115	2.2	5
	B2 ¹	-	115	-	5
	B3 ¹	-	115	-	5
	B4	108	115	0.64	5
	B5 ¹	-	115	-	5
20/02/2020	B1	111.8	115	3.98	5
	B2	116.1	115	0.898	5
	B3 ¹	-	115	-	5
	B4 ¹	-	115	-	5
	B5	113	115	1.3	5

Notes: 1. There was no trigger for this blasting event.
2. Criteria applies at the nearest residential location and not at the monitoring location.

The monitoring results show the relevant criteria were satisfied at all monitoring locations (refer to Figure 2.1) except for at B2 on 20 February 2020 where a 1.1 dB exceedance was recorded. In accordance with the ANZEC blasting guidelines, blast emissions are permitted to exceed the lower threshold on up to 5% of blasts in a 12 month period. Further, the monitoring location is approximately 150m closer to the quarry than the residences, so this measurement is likely higher than that experienced at the house.

5 Conclusion

EMM has completed an assessment of noise and blasting emissions from East Guyong Quarry operations. Noise monitoring was undertaken at locations around the site on 19 March 2020 as required by, and in accordance with, the site's approved NMP.

The results demonstrated that even though noise limits were not applicable due to the presence of average wind speeds greater than 3m/s, the received site noise levels at all monitoring locations satisfied the relevant noise criteria as per the PA_0193 and in accordance with the NMP for the East Guyong Quarry.

Therefore, it is concluded that noise levels from quarry operations satisfied the relevant criteria at all assessment locations identified in Condition 3(5) of PA_0193.

The blast overpressure and ground vibration monitoring results satisfied the relevant criteria at all monitoring locations for the three blast events that have been assessed, except for at B2 on 20 February 2020, where a

1.1 dB exceedance was recorded. In accordance with the ANZEC blasting guidelines, blast emissions are permitted to exceed the lower threshold on up to 5% of blasts in a 12 month period. Further, the monitoring location is approximately 150m closer to the quarry than the residences, so this measurement is likely higher than that experienced at the house.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Rick Scully', with a stylized, cursive script.

Rick Scully

Acoustic Consultant

rscully@emmconsulting.com.au

Review: KT (16/10/2020)

Appendix A

Glossary of acoustic terms

A number of technical terms are required for the discussion of noise. These are explained in Table A.1.

Table A.1 **Glossary of acoustic terms**

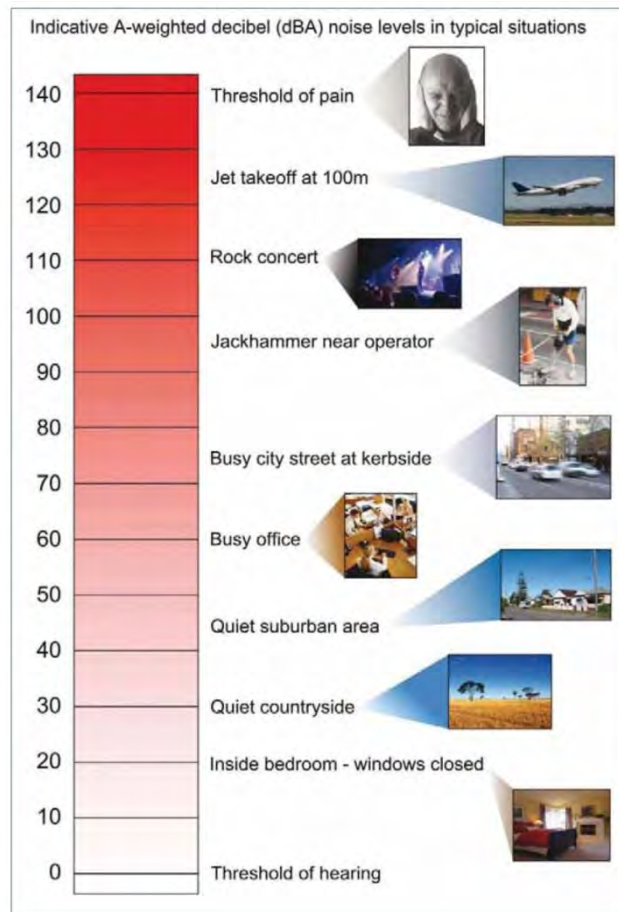
Term	Description
dB	Noise is measured in units called decibels (dB).
A-weighting	There are several scales for describing noise, the most common being the 'A-weighted' scale. This is an adjustment made to sound-level measurement to approximate the response of the human ear.
C-weighting	This is an adjustment made to sound-level measurements which takes account of low-frequency components of noise within the audibility range of humans.
L _{A90}	Commonly referred to as the background noise level. The A-weighted noise level exceeded 90% of the time.
L _{Aeq}	The A-weighted, energy average noise from a source. This is the equivalent continuous sound pressure level over a given period. The L _{Aeq} (15-min) descriptor refers to an L _{Aeq} noise level measured over a 15-minute period.
L _{Amax}	The A-weighted maximum root mean squared sound pressure level received during a measuring interval.
Day period	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening period	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night period	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 pm.
L _{peak}	The maximum instantaneous sound pressure during a measurement period or noise event.
PPV	The greatest instantaneous particle velocity during a given time interval.

It is useful to have an appreciation of decibels, the unit of noise measurement. Table A.2 gives an indication as to what an average person perceives about changes in noise levels:

Table A.2 **Perceived change in noise**

Change in sound level (dB)	Perceived change in noise
1 to 2	typically indiscernible
3	just perceptible
5	noticeable difference
10	twice (or half) as loud
15	large change
20	four times (or quarter) as loud

Examples of common noise levels are provided in Figure A.1.



Source: Road Noise Policy (Department of Environment, Climate Change and Water (DECCW) 2011).

Figure A.1 Common noise levels

Appendix B

Calibration certificates

CERTIFICATE OF CALIBRATION

CERTIFICATE No.: **SLM 25410 & FILT 5368**

Equipment Description: Sound Level Meter

Manufacturer: B & K

Model No: 2250 **Serial No:** 3008201

Microphone Type: B&K 4189 **Serial No:** 2983733

Preamplifier Type: B&K ZC0032 **Serial No:** 22666

Filter Type: 1/3 Octave **Serial No:** 3008201

Comments: All tests passed for class 1.
(See over for details)

Owner: EMM Consulting
Ground Floor, Suite 01, 20 Chandos St
St Leonards NSW 2065

Ambient Pressure: 1002 hPa ± 1.5 hPa

Temperature: 23 °C $\pm 2^\circ$ C **Relative Humidity:** 29% $\pm 5\%$

Date of Calibration: 21/08/2019 **Issue Date:** 21/08/2019

Acu-Vib Test Procedure: AVP10 (SLM) & AVP06 (Filters)

CHECKED BY: *LAB*

AUTHORISED SIGNATURE: *Hein Soc*

Accredited for compliance with ISO/IEC 17025 - Calibration
The results of the tests, calibration and/or measurements included in this document are traceable to
Australian/national standards.



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HEAD OFFICE

Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
Tel: (02) 96808133 Fax: (02) 96808233
Mobile: 0413 809806
web site: www.acu-vib.com.au

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Acoustic and Vibration
Measurements

Page 1 of 2
AVCERT10 Rev. 1.3 15.05.18

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: 25666

EQUIPMENT TESTED: Sound Level Calibrator

Manufacturer: Svantek

Type No: SV-36

Serial No: 86311

Owner:

EMM Consulting

Ground Floor, Suite 01, 20 Chandos St

St Leonards NSW 2065

Tests Performed: Measured output pressure level was found to be:

Parameter	Pre-Adj	Adj Y/N	Output: (db re 20 μ Pa)	Frequency: (Hz)	THD&N (%)
Level 1:	NA	N	94.09	999.99	0.89
Level 2:	NA	N	114.05	1000.00	0.32
Uncertainty:			± 0.11 dB	$\pm 0.05\%$	$\pm 0.20\%$
Uncertainty (at 95% c.l.) k=2					

CONDITION OF TEST:

Ambient Pressure: 1004 hPa ± 1.5 hPa **Relative Humidity:** 36% $\pm 5\%$

Temperature: 25 $^{\circ}\text{C} \pm 2^{\circ}\text{C}$

Date of Calibration: 04/10/2019

Issue Date: 08/10/2019

Acu-Vib Test Procedure: AVP02 (Calibrators)

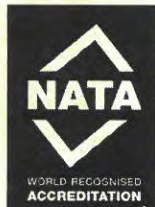
Test Method: AS IEC 60942 - 2017

CHECKED BY: *VKB* **AUTHORISED SIGNATURE:** *Hein Soe*

Accredited for compliance with ISO/IEC 17025 - Calibration

The results of the tests, calibration and/or measurements included in this document are traceable to Australian/national standards.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.



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Acoustic and Vibration
Measurements



HEAD OFFICE
Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
Tel: (02) 96808133 Fax: (02) 96808233
Mobile: 0412 809806
Web site: www.acu-vib.com.au

16 October 2020

Chris Cooke
Quarry Manager
Hanson Construction Materials Pty Ltd
Level 5, 75 George Street
Parramatta NSW 2150

Ground floor, 20 Chandos Street
St Leonards NSW 2065
PO Box 21
St Leonards NSW 1590

T 02 9493 9500
E info@emmconsulting.com.au
www.emmconsulting.com.au

Re: Quarter 2 - 2020: East Guyong Quarry noise and blast monitoring

Dear Chris,

1 Introduction

EMM Consulting Pty Ltd (EMM) has been commissioned by Hanson Construction Materials Pty Ltd (NSW) (Hanson) to complete quarterly noise monitoring for the East Guyong Quarry, as required by the site's approved Noise Management Plan. The quarry is located approximately 22 km southeast of Orange, NSW. Operator-attended noise monitoring was undertaken on 17 June 2020.

The following material was referenced as part of this assessment:

- Environment Protection Authority (EPA), *Industrial Noise Policy* (INP) 2000;
- Environment Protection Authority (EPA), *Industrial Noise Policy - Application notes* 2017;
- Environment Protection Authority (EPA), *Noise Policy for Industry* (NPfI) 2017;
- Hanson Construction Materials and R. W. Corkery & Co Pty Limited (RWC), *Noise Management Plan for the East Guyong Quarry* (NMP) – Mod 2 Revision, July 2019;
- Department of Planning and Infrastructure (DP&I), *East Guyong Quarry Project Modification (06_0193 MOD 1) approval* (PA) 2012; and
- Australian and New Zealand Environment Council (ANZEC) 1990, *Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration*.

Analysis of data from four blast events that occurred on 16 April and 4 June has also been included in this report.

Several technical terms are discussed in this report and are explained in Appendix A.

2 Methodology

2.1 Site operations

At the time of the attended noise monitoring on 17 June 2020, the quarry's activities comprised of the following:

- crushing and screening plant;
- extraction of basalt using standard drill, load and haul techniques;
- processing of extracted basalt and stockpiling of material; and
- transportation of quarry products.

The quarry's approved hours of operation are:

- Monday to Friday (non-daylight savings) from 6 am to 6 pm;
- Monday to Friday (daylight savings) from 6 am to 8 pm; and
- Saturdays from 7 am to 1 pm.

Material crushing and screening currently occurs on site from Monday to Thursday. This restriction to approved hours is an operational decision by the quarry and aids in the planning for maintenance and repairs.

2.2 Noise monitoring

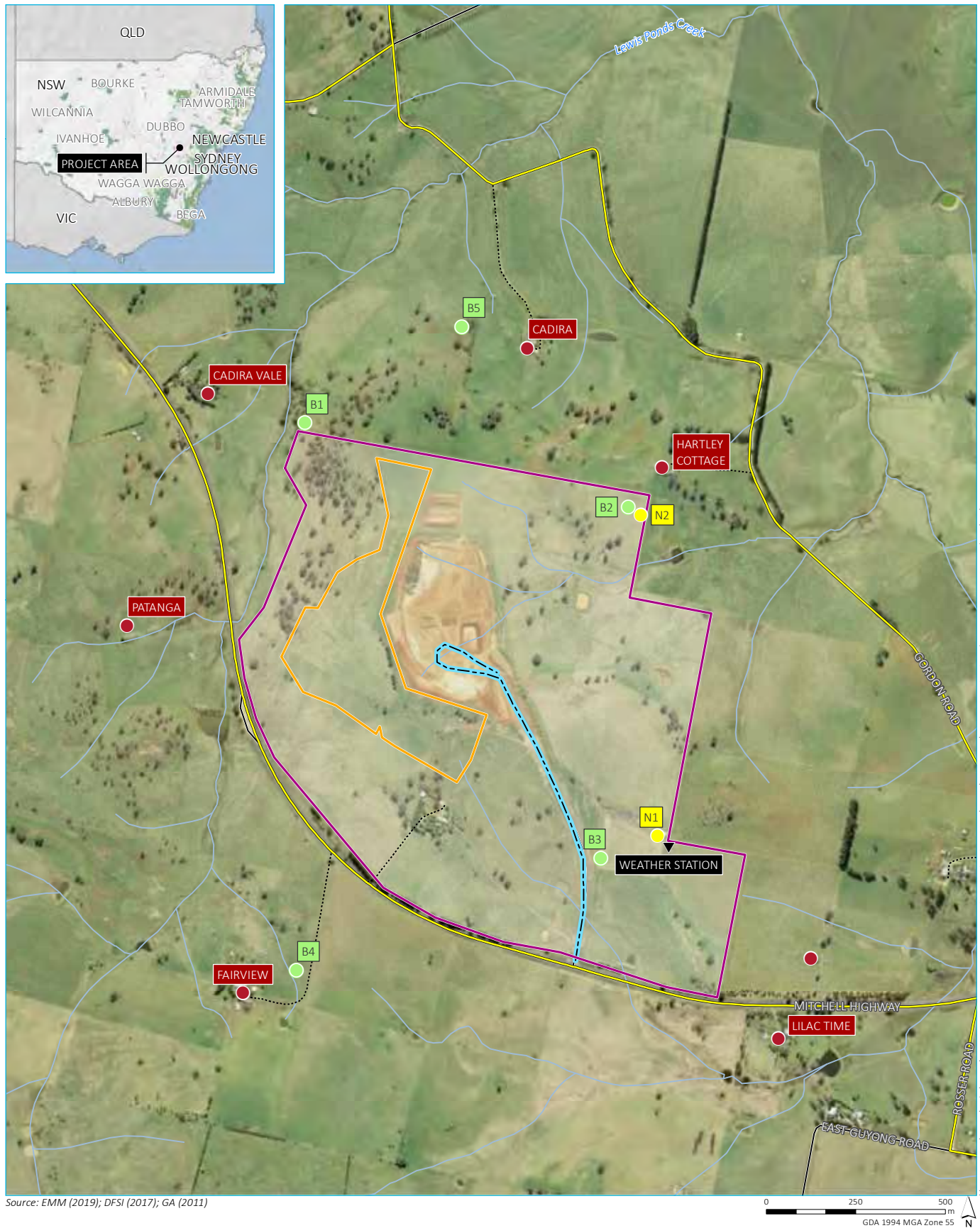
Operator-attended 15-minute noise measurements were conducted at locations N1 and N2, as shown in Figure 1, when the quarry was in full operation. The operator quantified the contribution of each significant quarry noise source where possible. Noise monitoring was conducted in general accordance with the INP and Australian Standard AS 1055.1-2018 *Acoustics - Description and Measurement of Environmental Noise - General Procedures*.

A type 1 Svantek 977 sound analyser (s/n 59682) was used for the noise monitoring. The sound analyser was calibrated before and after the completion of the surveys using a Rion NC-74 calibrator (s/n 37372752). The instruments were within a current NATA calibration period at the time of the noise monitoring and relevant certificates are provided in Appendix B.

2.3 Assessment locations

The noise monitoring included four 15-minute operator-attended noise measurements during the daytime period on 17 June 2020 to quantify noise emissions from the quarry at locations N1 and N2. Noise monitoring was not conducted prior to 7 am as the quarry was not in operation.

Locations N1 and N2 are near the south-east and north-east boundaries of the site, respectively. Location N1 is approximately 500 m from "Wheatfields", the closest residence situated south-east of the quarry. Location N2 is approximately 150 m from "Hartley Cottage", the closest residence situated north-east of the quarry. These monitoring locations were selected to not inconvenience surrounding residents and are consistent with the approved Noise Management Plan for the East Guyong Quarry (RWC, 2019). Monitoring at these locations, rather than at the residences, also provides a better opportunity to quantify site related noise since they are closer to the operations.



KEY

- | | | |
|---|---|--|
| ● Blast monitoring location | Site boundary | Main road |
| ● Residences | Extrac on area boundary | Local road |
| ● A ended noise monitoring location | Transport route | Vehicular track |
| ▼ Weather station | Watercourse/drainage line | |

Site location and monitoring plan

East Guyong Quarry
Noise and blast monitoring
Figure 1

3 Criteria

3.1 Operational noise

Condition 3(5) of PA 06_0193 states that the noise assessment criteria are $L_{Aeq,15 \text{ minute}}$ 35 dB at any residence for all assessment periods. The exception is the "Fairview" residence which has a daytime criterion of $L_{Aeq,15 \text{ minute}}$ 36 dB. In accordance with the PA 06_0193, "Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy."

As per Condition 3(5) of PA_0193, to demonstrate compliance at residential locations, the noise monitoring results are to be assessed against the following (intermediate) noise criteria for monitoring locations N1 and N2:

- N1 - $L_{Aeq,15 \text{ minute}}$ 43 dB; and
- N2 - $L_{Aeq,15 \text{ minute}}$ 50 dB.

It is stated in the NMP that by satisfying criteria at these intermediate locations, quarry noise at neighbouring residences would also satisfy residential criteria. This assumes the presence of soil and product stockpiles, bunding and intervening topography between the site and surrounding residences, which provide some degree of attenuation of site noise.

Further to the above, section 11.1.3 of the INP identifies that a development is deemed to be in non-compliance if the monitored noise levels from the development are more than 2 dB above the statutory limit.

3.2 Low frequency noise criteria

Section 11.2.3 of the NMP states that modification factors in Section 4 of the INP (EPA 2000) should be applied to the measured noise levels where applicable. The INP application notes state that Section 4 of the INP has been withdrawn and the modifying factor adjustments outlined in Fact Sheet C of the NPfI are to be used when assessing the characteristics of a noise source. Fact sheet C of the NPfI (EPA 2017) states that modification factor corrections shall be applied to the measured noise levels where relevant.

Fact sheet C of the NPfI (EPA 2017) provides guidelines for applying modifying factor corrections to account for annoying noise characteristics, such as tonal and low frequency noise emissions. The NPfI specifies that for low frequency noise, a difference of 15 dB or more between site 'C-weighted' and site 'A-weighted' noise emission levels identifies the potential for an unbalanced spectrum and potential increased annoyance.

Where a difference of 15 dB or more between site 'C-weighted' and site 'A-weighted' noise emission levels is identified, the one-third octave noise levels recorded should be compared to the values in Table C2 of the NPfI (EPA 2017), which has been reproduced in Table 3.1 below.

Table 3.1 One-third octave low-frequency noise thresholds

One-third octave $L_{Zeq,15 \text{ minute}}$ threshold level													
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB (Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

The modifying factor correction to be applied where the site 'C-weighted' and site 'A-weighted' noise emission level is 15 dB or more and:

- where any of the one-third octave noise levels in Table 3.1 are exceeded by up to and including 5 dB and cannot be mitigated, a 2 dB positive adjustment to measured/predicted A-weighted levels applies for the evening/night period; or
- where any of the one-third octave noise levels in Table 3.1 are exceeded by more than 5 dB and cannot be mitigated, a 5 dB positive adjustment to measured/predicted A-weighted levels applies for the evening/night period and a 2 dB positive adjustment applies for the daytime period.

Hence, where possible throughout each survey the operator has estimated the difference between site 'C-weighted' and site 'A-weighted' noise emission levels by matching audible sounds with the response of the analyser ($L_{Ceq} - L_{Aeq}$). Where this was deemed to be 15 dB or greater, the measured one-third octave frequencies have been compared to the values in Table 3.1 to identify the relevant modifying factor correction (if applicable). This method has been applied to this assessment as presented in Section 4.

It is of note that the NPfl (EPA 2017) states that low-frequency noise corrections only apply under the standard and/or noise-enhancing (ie applicable) meteorological conditions.

3.3 Blast monitoring

Blast overpressure and vibration monitoring is managed by Hanson for all blast events. Blast overpressure and ground vibration are monitored at three locations within or at the site's boundary as well as two locations outside of the site's boundary (one south of the Mitchell Highway near the Fairview property and one north of the site near the Cadira property). Monitoring locations are situated closer to blasting locations than the residential structures (refer to Figure 2.1), and therefore overpressure and vibration levels would likely be lower at the actual residential dwellings than those measured.

Blast emissions criteria for the quarry apply at any residence on privately-owned land surrounding the site and are presented in Table 3.2.

Table 3.2 Blast overpressure and vibration criteria

Location	Airblast overpressure criteria (dB (Linear Peak))	Ground vibration criteria (mm/s (Peak velocity))	Allowable exceedance
Any privately-owned residence surrounding the site.	115	5	5% of the total number of blasts in a 12-month period
	120	10	0%

4 Results

4.1 Noise monitoring results

Noise monitoring results for locations N1 and N2 are presented in Table 4.1. Data recorded by the site's weather station (shown in Figure 2.1) was used to identify weather conditions during the monitoring period and to determine the applicability of noise limits. Wind speed and direction observations are presented in Table 4.1

Wind speed averages were below 3 m/s (at 10 m above ground) during the first measurement at N2, however wind speeds were above 3 m/s for all other measurements; hence noise limits were applicable during only the first attended measurement at N2 in accordance with INP (EPA 2000).

Low frequency noise modifying factors, in accordance with fact sheet C2 of the NPfl (EPA 2017), were not applied to any measured site contribution as measured noise levels did not exceed the relevant LFN thresholds.

All quarry contributions measured at locations N1 and N2 satisfied the relevant noise criteria as per the NMP, regardless of whether the noise limits were applicable. It is therefore expected that relevant criteria for surrounding residential receivers would also be satisfied.

Based on the preceding information, noise levels from the quarry were expected to satisfy the relevant residential criteria at all assessment locations identified in Condition 3(5) of PA_0193.

Table 4.1 **Attended noise monitoring summary – 17 June 2019**

Location	Start time	Attended noise monitoring results dB					Criteria dB	Meteorological conditions ¹		Criteria Applies? (Y/N)	Exceedance	Comments
		Total measured			Site contribution			Wind speed (m/s)	Wind direction ²			
		L ₉₀	L _{Aeq}	L _{Amax}	LFN mod. factor	L _{Aeq}						
N2	10:19am	39	43	59	Nil	42	50	2.3	147	Y	Nil	Site consistently audible including crushing plant, machinery traversing and grinding. Other sources include consistent traffic noise from Mitchell Highway and occasional birdsong.
N2	10:36am	36	42	61	Nil	38	50	4.4	115	N	N/A	Site consistently audible including crushing plant and machinery traversing. Other sources include consistent traffic noise from Mitchell Highway, occasional birdsong, livestock (sheep) and an aircraft overflight.
N1	11:09am	39	44	58	Nil	36	42	6.6	98	N	N/A	Site occasionally audible during lulls in traffic including crushing plant. Other sources include consistent traffic noise from Mitchell Highway and occasional birdsong.
N1	11:25am	38	43	54	Nil	35	42	6.8	95	N	N/A	Site occasionally audible during lulls in traffic including crushing plant and machinery revs. Other sources include consistent traffic noise from Mitchell Highway and occasional birdsong.

Notes: 1. Meteorological data was obtained from the site weather station at a height of 10 m above ground.
2. Wind direction reported in degrees from north (0°)
3. N/A = Not Applicable

4.2 Blast overpressure and ground vibration

Two blast events occurred at the quarry since the last quarterly noise monitoring in March 2020. The blast overpressure and vibration monitoring results were provided by Hanson and are presented in Table 4.2. The monitoring results show the relevant criteria were satisfied at all monitoring locations (refer to Figure 2.1).

Table 4.2 Blast emissions monitoring results

Date	Monitoring location	Airblast overpressure level (dB(Linear Peak))		Ground vibration - Peak particle velocity (mm/s)	
		Measured	Criteria ²	Measured	Criteria ²
16/04/2020	B1 ²	-	115	-	5
	B2 ²	-	115	-	5
	B3 ²	100	115	0.5	5
	B4 ²	107	115	1.37	5
	B5 ²	101.9	115	0.64	5
04/06/2020	B1 ²	106.5	115	4.45	5
	B2 ²	107.5	115	0.88	5
	B3 ²	-	115	-	5
	B4 ²	-	115	-	5
	B5 ²	105	115	1.35	5

Notes: 1. A dash indicates there was no trigger for this blasting event at this monitoring location.
2. Criteria applies at the nearest residential location and not at the monitoring location.

5 Conclusion

EMM has completed an assessment of noise and blasting emissions from East Guyong Quarry operations. Noise monitoring was undertaken at locations around the site on 17 June 2020 as required by, and in accordance with, the site's approved NMP.

Noise limits were not applicable due to wind speeds greater than 3 m/s for three of the four attended measurements. Regardless of whether noise limits were applicable, the results demonstrated that the received site noise levels at all monitoring locations satisfied the relevant noise criteria as per the PA_0193 and in accordance with the NMP for the East Guyong Quarry.

Therefore, it is concluded that noise levels from quarry operations satisfied the relevant criteria at all assessment locations identified in Condition 3(5) of PA_0193.

The blast overpressure and ground vibration monitoring results satisfied the relevant criteria at all monitoring locations for the two blast events that have been assessed for this reporting period.

Yours sincerely



Rick Scully

Acoustic Consultant

rscully@emmconsulting.com.au

Review: KT (16/10/2020)

Appendix A

Glossary of acoustic terms

A number of technical terms are required for the discussion of noise. These are explained in Table A.1.

Table A.1 **Glossary of acoustic terms**

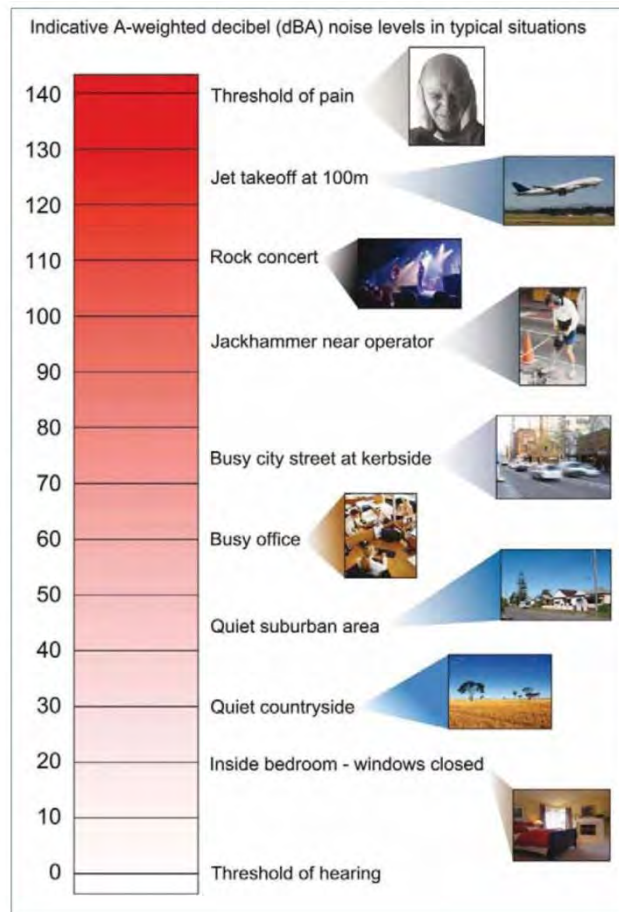
Term	Description
dB	Noise is measured in units called decibels (dB).
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C-weighting	This is an adjustment made to sound-level measurements which takes account of low-frequency components of noise within the audibility range of humans.
L _{A90}	Commonly referred to as the background noise level. The A-weighted noise level exceeded 90% of the time.
L _{Aeq}	The A-weighted, energy average noise from a source. This is the equivalent continuous sound pressure level over a given period. The L _{Aeq} (15-min) descriptor refers to an L _{Aeq} noise level measured over a 15-minute period.
L _{Amax}	The A-weighted maximum root mean squared sound pressure level received during a measuring interval.
Day period	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening period	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night period	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 pm.
L _{peak}	The maximum instantaneous sound pressure during a measurement period or noise event.
PPV	The greatest instantaneous particle velocity during a given time interval.

It is useful to have an appreciation of decibels, the unit of noise measurement. Table A.2 gives an indication as to what an average person perceives about changes in noise levels:

Table A.2 **Perceived change in noise**

Change in sound level (dB)	Perceived change in noise
1 to 2	typically indiscernible
3	just perceptible
5	noticeable difference
10	twice (or half) as loud
15	large change
20	four times (or quarter) as loud

Examples of common noise levels are provided in Figure A.1.



Source: Road Noise Policy (Department of Environment, Climate Change and Water (DECCW) 2011).

Figure A.1 Common noise levels

Appendix B

Calibration certificates

CERTIFICATE OF CALIBRATION

CERTIFICATE No.: **SLM 23713 & FILT 4907**

Equipment Description: Sound & Vibration Analyser

Manufacturer: Svantek

Model No: Svan-977 **Serial No:** 59682

Microphone Type: 7052E **Serial No:** 69609

Preamplifier Type: SV12L **Serial No:** 64882

Filter Type: 1/1 Octave **Serial No:** 59682

Comments: All tests passed for class 1.
(See over for details)

Owner: EMM Consulting
Suite 01, 20 Chandos Street
St Leonards NSW 2065

Ambient Pressure: 1001 hPa ± 1.5 hPa

Temperature: 24 °C $\pm 2^\circ$ C **Relative Humidity:** 58% $\pm 5\%$

Date of Calibration: 23/10/2018 **Issue Date:** 23/10/2018

Acu-Vib Test Procedure: AVP10 (SLM) & AVP06 (Filters)

CHECKED BY: *JK*

AUTHORISED SIGNATURE:

Jack Kieft

Accredited for compliance with ISO/IEC 17025 - Calibration
The results of the tests, calibration and/or measurements included in this document are traceable to
Australian/national standards.



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HEAD OFFICE

Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
Tel: (02) 96808133 Fax: (02) 96808233
Mobile: 0413 809806
web site: www.acu-vib.com.au

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Measurements

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CERTIFICATE OF CALIBRATION

CERTIFICATE No: 26415

EQUIPMENT TESTED: Sound Level Calibrator

Manufacturer: Rion
Type No: NC-74 **Serial No:** 34372752
Owner: EMM Consulting
20 Chandos Street
St Leonards NSW 2065

Tests Performed: Measured output pressure level was found to be:

Parameter	Pre-Adj	Adj Y/N	Output: (db re 20 μ Pa)	Frequency: (Hz)	THD&N (%)
Level 1:	NA	N	94.16	1002.63	4.47
Level 2:	NA	N	NA	NA	NA
Uncertainty:			± 0.11 dB	$\pm 0.05\%$	$\pm 0.20\%$
Uncertainty (at 95% c.l.) k=2					

CONDITION OF TEST:

Ambient Pressure: 1002 hPa ± 1.5 hPa **Relative Humidity:** 56% $\pm 5\%$

Temperature: 24 $^{\circ}$ C $\pm 2^{\circ}$ C

Date of Calibration: 21/02/2020

Issue Date: 24/02/2020

Acu-Vib Test Procedure: AVP02 (Calibrators)

Test Method: AS IEC 60942 - 2017

CHECKED BY: *KB* **AUTHORISED SIGNATURE:** *Jack Kidd*

Accredited for compliance with ISO/IEC 17025 - Calibration

The results of the tests, calibration and/or measurements included in this document are traceable to Australian/national standards.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.



Accredited Lab. 9262
Acoustic and Vibration
Measurements



HEAD OFFICE
Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
Tel: (02) 96808133 Fax: (02) 96808233
Mobile: 0413 809806
Web site: www.acu-vib.com.au

16 October 2020

Chris Cooke
Quarry Manager
Hanson Construction Materials Pty Ltd
Level 5, 75 George Street
Parramatta NSW 2150

Ground floor, 20 Chandos Street
St Leonards NSW 2065
PO Box 21
St Leonards NSW 1590

T 02 9493 9500
E info@emmconsulting.com.au
www.emmconsulting.com.au

Re: Quarter 3 - 2020: East Guyong Quarry noise and blast monitoring

Dear Chris,

1 Introduction

EMM Consulting Pty Ltd (EMM) has been commissioned by Hanson Construction Materials Pty Ltd (NSW) (Hanson) to complete quarterly noise monitoring for the East Guyong Quarry, as required by the site's approved Noise Management Plan. The quarry is located approximately 22 km southeast of Orange, NSW. Operator-attended noise monitoring was undertaken on 15 September 2020.

The following material was referenced as part of this assessment:

- Environment Protection Authority (EPA), *Industrial Noise Policy* (INP) 2000;
- Environment Protection Authority (EPA), *Industrial Noise Policy - Application notes* 2017;
- Environment Protection Authority (EPA), *Noise Policy for Industry* (NPfI) 2017;
- Hanson Construction Materials and R. W. Corkery & Co Pty Limited (RWC), *Noise Management Plan for the East Guyong Quarry* (NMP) – Mod 2 Revision, July 2019;
- Department of Planning and Infrastructure (DP&I), *East Guyong Quarry Project Modification (06_0193 MOD 1) approval* (PA) 2012; and
- Australian and New Zealand Environment Council (ANZEC) 1990, *Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration*.

Analysis of data from five blast events that occurred on 19 June (two blasts), 23 July and 13 August (two blasts) 2020 has also been included in this report.

Several technical terms are discussed in this report and are explained in Appendix A.

2 Methodology

2.1 Site operations

At the time of the attended noise monitoring on 15 September 2020, the quarry's activities comprised of the following:

- extraction of basalt using standard drill, load and haul techniques;
- processing of extracted basalt and stockpiling of material; and
- transportation of quarry products.

The quarry's approved hours of operation are:

- Monday to Friday (non-daylight savings) from 6 am to 6 pm;
- Monday to Friday (daylight savings) from 6 am to 8 pm; and
- Saturdays from 7 am to 1 pm.

Material crushing and screening currently occurs on site from Monday to Thursday. This restriction to approved hours is an operational decision by the quarry and aids in the planning for maintenance and repairs.

2.2 Noise monitoring

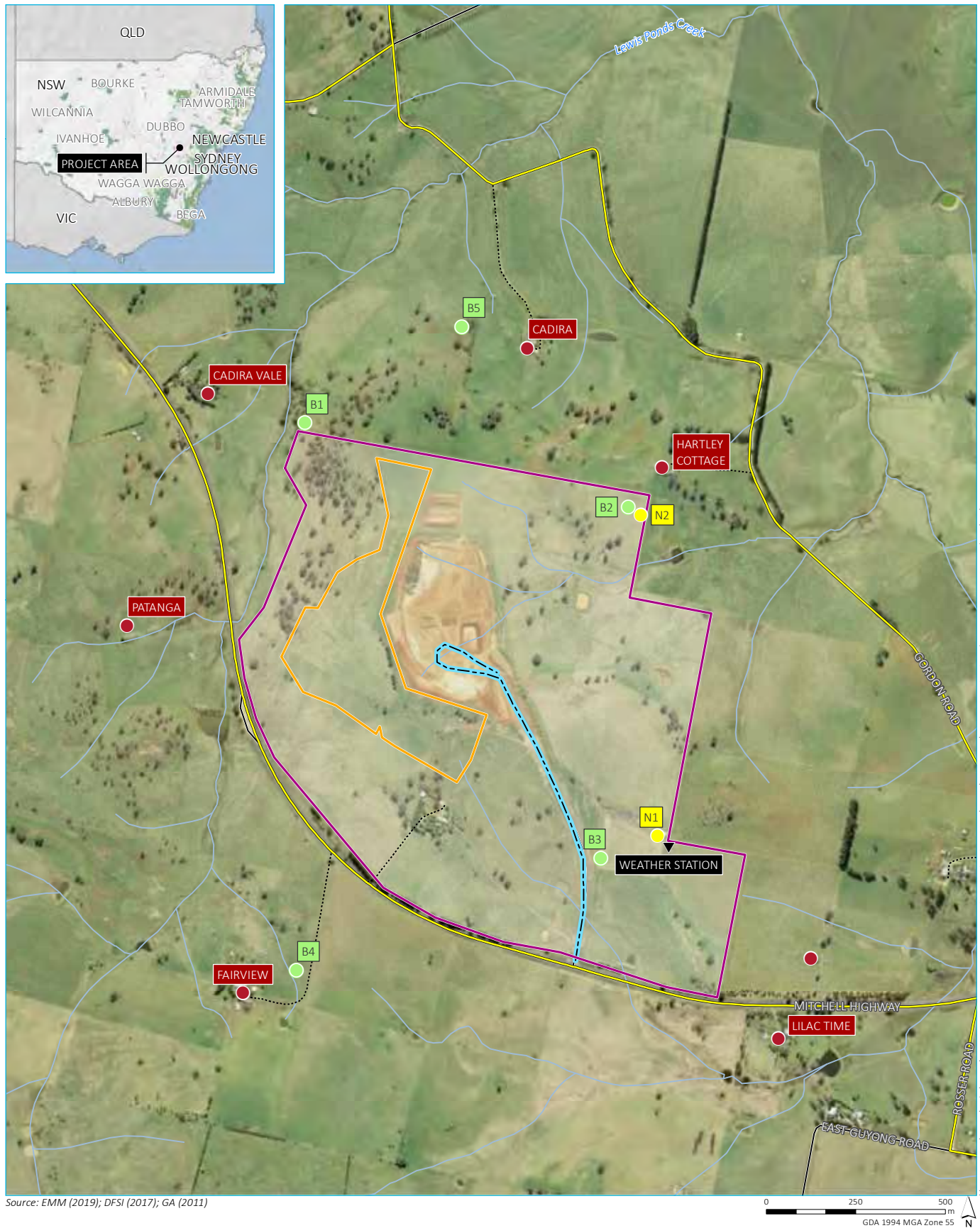
Operator-attended 15-minute noise measurements were conducted at locations N1 and N2, as shown in Figure 1, when the quarry was in full operation. The operator quantified the contribution of each significant quarry noise source where possible. Noise monitoring was conducted in general accordance with the INP and Australian Standard AS 1055.1-2018 *Acoustics - Description and Measurement of Environmental Noise - General Procedures*.

A Svantek 977 Type 1 sound level meter (s/n 59682) was used for the noise monitoring. The sound analyser was calibrated before and after the completion of the surveys using a Rion NC74 calibrator (s/n 34372752). The instruments were within a current NATA calibration period at the time of the noise monitoring and relevant certificates are provided in Appendix B.

2.3 Assessment locations

The noise monitoring included four 15-minute operator-attended noise measurements during the daytime period on 15 September 2020 to quantify noise emissions from the quarry at locations N1 and N2. Noise monitoring was not conducted prior to 7 am as the quarry was not in operation.

Locations N1 and N2 are near the south-east and north-east boundaries of the site, respectively. Location N1 is approximately 500 m from "Wheatfields", the closest residence situated south-east of the quarry. Location N2 is approximately 150 m from "Hartley Cottage", the closest residence situated north-east of the quarry. These monitoring locations were selected to not inconvenience surrounding residents and are consistent with the approved Noise Management Plan for the East Guyong Quarry (RWC, 2019). Monitoring at these locations, rather than at the residences, also provides a better opportunity to quantify site related noise since they are closer to the operations.



KEY

- | | | |
|-------------------------------------|-----------------------------|-----------------------|
| ● Blast monitoring location | ■ Site boundary | — Main road |
| ● Residences | ■ Extrac on area boundary | — Local road |
| ● A ended noise monitoring location | — Transport route | Vehicular track |
| ▼ Weather station | — Watercourse/drainage line | |

Site location and monitoring plan

East Guyong Quarry
Noise and blast monitoring
Figure 1

3 Criteria

3.1 Operational noise

Condition 3(5) of PA 06_0193 states that the noise assessment criteria are $L_{Aeq,15 \text{ minute}}$ 35 dB at any residence for all assessment periods. The exception is the "Fairview" residence which has a daytime criterion of $L_{Aeq,15 \text{ minute}}$ 36 dB. In accordance with the PA 06_0193, "Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy."

As per Condition 3(5) of PA_0193, to demonstrate compliance at residential locations, the noise monitoring results are to be assessed against the following (intermediate) noise criteria for monitoring locations N1 and N2:

- N1 - $L_{Aeq,15 \text{ minute}}$ 43 dB; and
- N2 - $L_{Aeq,15 \text{ minute}}$ 50 dB.

It is stated in the NMP that by satisfying criteria at these intermediate locations, quarry noise at neighbouring residences would also satisfy residential criteria. This assumes the presence of soil and product stockpiles, bunding and intervening topography between the site and surrounding residences, which provide some degree of attenuation of site noise.

Further to the above, section 11.1.3 of the INP identifies that a development is deemed to be in non-compliance if the monitored noise levels from the development are more than 2 dB above the statutory limit.

3.2 Low frequency noise criteria

Section 11.2.3 of the NMP states that modification factors in Section 4 of the INP (EPA 2000) should be applied to the measured noise levels where applicable. The INP application notes state that Section 4 of the INP has been withdrawn and the modifying factor adjustments outlined in Fact Sheet C of the NPfI are to be used when assessing the characteristics of a noise source. Fact sheet C of the NPfI (EPA 2017) states that modification factor corrections shall be applied to the measured noise levels where relevant.

Fact sheet C of the NPfI (EPA 2017) provides guidelines for applying modifying factor corrections to account for annoying noise characteristics, such as tonal and low frequency noise emissions. The NPfI specifies that for low frequency noise, a difference of 15 dB or more between site 'C-weighted' and site 'A-weighted' noise emission levels identifies the potential for an unbalanced spectrum and potential increased annoyance.

Where a difference of 15 dB or more between site 'C-weighted' and site 'A-weighted' noise emission levels is identified, the one-third octave noise levels recorded should be compared to the values in Table C2 of the NPfI (EPA 2017), which has been reproduced in Table 3.1 below.

Table 3.1 One-third octave low-frequency noise thresholds

One-third octave $L_{Zeq,15 \text{ minute}}$ threshold level													
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB (Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

The modifying factor correction to be applied where the site 'C-weighted' and site 'A-weighted' noise emission level is 15 dB or more and:

- where any of the one-third octave noise levels in Table 3.1 are exceeded by up to and including 5 dB and cannot be mitigated, a 2 dB positive adjustment to measured/predicted A-weighted levels applies for the evening/night period; or
- where any of the one-third octave noise levels in Table 3.1 are exceeded by more than 5 dB and cannot be mitigated, a 5 dB positive adjustment to measured/predicted A-weighted levels applies for the evening/night period and a 2 dB positive adjustment applies for the daytime period.

Hence, where possible throughout each survey the operator has estimated the difference between site 'C-weighted' and site 'A-weighted' noise emission levels by matching audible sounds with the response of the analyser ($L_{Ceq} - L_{Aeq}$). Where this was deemed to be 15 dB or greater, the measured one-third octave frequencies have been compared to the values in Table 3.1 to identify the relevant modifying factor correction (if applicable). This method has been applied to this assessment as presented in Section 4.

It is of note that the NPfl (EPA 2017) states that low-frequency noise corrections only apply under the standard and/or noise-enhancing (ie applicable) meteorological conditions.

3.3 Blast monitoring

Blast overpressure and vibration monitoring is managed by Hanson for all blast events. Blast overpressure and ground vibration are monitored at three locations within or at the site's boundary as well as two locations outside of the site's boundary (one south of the Mitchell Highway near the Fairview property and one north of the site near the Cadira property). Monitoring locations are situated closer to blasting locations than the residential structures (refer to Figure 2.1), and therefore overpressure and vibration levels would likely be lower at the actual residential dwellings than those measured.

Blast emissions criteria for the quarry apply at any residence on privately-owned land surrounding the site and are presented in Table 3.2.

Table 3.2 Blast overpressure and vibration criteria

Location	Airblast overpressure criteria (dB (Linear Peak))	Ground vibration criteria (mm/s (Peak velocity))	Allowable exceedance
Any privately-owned residence surrounding the site.	115	5	5% of the total number of blasts in a 12-month period
	120	10	0%

4 Results

4.1 Noise monitoring results

Noise monitoring results for locations N1 and N2 are presented in Table 4.1. Data recorded by the site's weather station (shown in Figure 2.1) was used to identify weather conditions during the monitoring period and to determine the applicability of noise limits. Wind speed and direction observations are presented in Table 4.1

Wind speed averages were below 3 m/s (at 10 m above ground) during three of the four measurements at N1 and N2; hence noise limits were applicable during these measurements. During the first measurement at N1, wind speeds were greater than 3 m/s; hence noise limits were not applicable during this measurement. Regardless, site noise contribution was below (satisfied) the relevant noise limits during all attended measurements.

Low frequency noise modifying factors, in accordance with fact sheet C2 of the NPfI (EPA 2017), were not applied to any measured site contribution as measured noise levels did not exceed the relevant LFN thresholds.

All quarry contributions measured at locations N1 and N2 satisfied the relevant noise criteria as per the NMP. It is therefore expected that relevant criteria for surrounding residential receivers would also be satisfied.

Based on the preceding information, noise levels from the quarry were expected to satisfy the relevant residential criteria at all assessment locations identified in Condition 3(5) of PA_0193.

Table 4.1 **Attended noise monitoring summary – 15 September 2020**

Location	Start time	Attended noise monitoring results dB						Criteria dB	Meteorological conditions ¹		Criteria Applies? (Y/N)	Exceedance	Comments
		Total measured			Site contribution				Wind speed (m/s)	Wind direction ²			
		L ₉₀	L _{Aeq}	L _{Amax}	LFN mod. factor	L _{Aeq}	L _{Aeq}						
N1	11:05am	33	38	58	-	34	43	2.9	31	Y	Nil	Quarry audible throughout measurement including hum of crushing/screening plant and trucks/machinery traversing. Other ambient noise included birdsong, highway traffic, a farmer on quad bike and a dog barking.	
N1	11:20am	31	38	60	-	34	43	3.0	27	Y	Nil	Quarry audible throughout measurement including hum of crushing/screening plant and trucks/machinery traversing. Other ambient noise included birdsong, insects, highway traffic, livestock (cows) and two aircraft overflights.	
N2	11:53am	33	39	64	-	37	50	3.8	12	N	Nil	Quarry dominant throughout measurement including hum of crushing/screening plant, FEL handling material and trucks/machinery traversing. Other ambient noise included birdsong and highway traffic.	
N2	12:08pm	32	37	54	-	36	50	2.7	14	Y	Nil	Quarry dominant throughout measurement including hum of crushing/screening plant, FEL handling material and trucks/machinery traversing. Other ambient noise included birdsong, highway traffic and an aircraft overflight.	

Notes: 1. Meteorological data was obtained from the site weather station at a height of 10 m above ground.
2. Wind direction reported in degrees from north (0°)
3. N/A = Not Applicable

4.2 Blast overpressure and ground vibration

Five blast events have occurred at the quarry since the last quarterly noise monitoring in June 2020. The blast overpressure and vibration monitoring results were provided by Hanson and are presented in Table 4.2. The monitoring results show the relevant criteria were satisfied at all monitoring locations (refer to Figure 2.1).

Table 4.2 Blast emissions monitoring results

Date	Monitoring location	Airblast overpressure level (dB(Linear Peak))		Ground vibration - Peak particle velocity (mm/s)	
		Measured	Criteria ²	Measured	Criteria ²
19/06/2020	B1	109.5	115	0.69	5
	B2	92.3	115	0.12	5
	B3	102.3	115	0.44	5
	B4	103.5	115	0.53	5
	B5	100.1	115	1.3	5
19/06/2020	B1 ¹	0 ¹	115	0 ¹	5
	B2 ¹	0 ¹	115	0 ¹	5
	B3 ¹	0 ¹	115	0 ¹	5
	B4 ¹	0 ¹	115	0 ¹	5
	B5 ¹	0 ¹	115	0 ¹	5
23/07/2020	B1	105.7	115	0.9	5
	B2 ¹	0 ¹	115	0 ¹	5
	B3	102.1	115	0.61	5
	B4	104.7	115	0.5	5
	B5	93.9	115	1.8	5
13/08/2020	B1	107.1	115	3.78	5
	B2 ¹	0 ¹	115	0 ¹	5
	B3 ¹	0 ¹	115	0 ¹	5
	B4	103.9	115	0.59	5
	B5	103.9	115	2.73	5
13/08/2020	B1	114.7	115	0.6	5
	B2 ¹	0 ¹	115	0 ¹	5
	B3 ¹	0 ¹	115	0 ¹	5
	B4	106.5	115	0.66	5
	B5 ¹	0 ¹	115	0 ¹	5

Notes: 1. There was no trigger for this blasting event.
2. Criteria applies at the nearest residential location and not at the monitoring location.

5 Conclusion

EMM has completed an assessment of noise and blasting emissions from East Guyong Quarry operations. Noise monitoring was undertaken at locations around the site on 15 September 2020 as required by, and in accordance with, the site's approved NMP.

The results demonstrated that the received site noise levels at all monitoring locations satisfied the relevant noise criteria as per the PA_0193 and in accordance with the NMP for the East Guyong Quarry.

Therefore, it is concluded that noise levels from quarry operations satisfied the relevant criteria at all assessment locations identified in Condition 3(5) of PA_0193.

The blast overpressure and ground vibration monitoring results satisfied the relevant criteria at all monitoring locations for the five blast events that have been assessed.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Rick Scully', with a stylized, cursive script.

Rick Scully

Acoustic Consultant

rscully@emmconsulting.com.au

Review: KT (16/10/2020)

Appendix A

Glossary of acoustic terms

A number of technical terms are required for the discussion of noise. These are explained in Table A.1.

Table A.1 **Glossary of acoustic terms**

Term	Description
dB	Noise is measured in units called decibels (dB).
A-weighting	There are several scales for describing noise, the most common being the 'A-weighted' scale. This is an adjustment made to sound-level measurement to approximate the response of the human ear.
C-weighting	This is an adjustment made to sound-level measurements which takes account of low-frequency components of noise within the audibility range of humans.
L _{A90}	Commonly referred to as the background noise level. The A-weighted noise level exceeded 90% of the time.
L _{Aeq}	The A-weighted, energy average noise from a source. This is the equivalent continuous sound pressure level over a given period. The L _{Aeq} (15-min) descriptor refers to an L _{Aeq} noise level measured over a 15-minute period.
L _{Amax}	The A-weighted maximum root mean squared sound pressure level received during a measuring interval.
Day period	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening period	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night period	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 pm.
L _{peak}	The maximum instantaneous sound pressure during a measurement period or noise event.
PPV	The greatest instantaneous particle velocity during a given time interval.

It is useful to have an appreciation of decibels, the unit of noise measurement. Table A.2 gives an indication as to what an average person perceives about changes in noise levels:

Table A.2 **Perceived change in noise**

Change in sound level (dB)	Perceived change in noise
1 to 2	typically indiscernible
3	just perceptible
5	noticeable difference
10	twice (or half) as loud
15	large change
20	four times (or quarter) as loud

Examples of common noise levels are provided in Figure A.1.

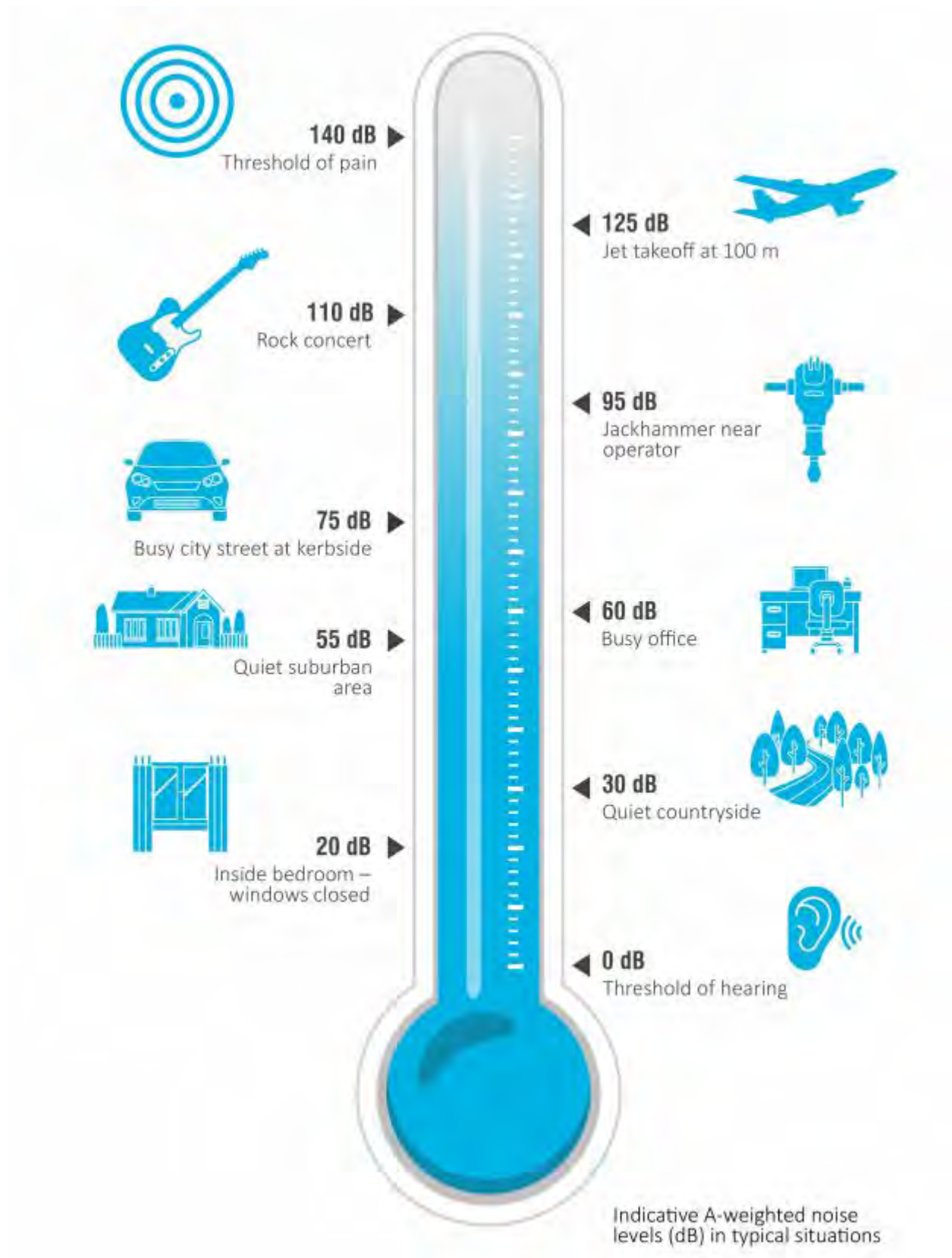


Figure A.1 Common noise levels

Appendix B

Calibration certificates

CERTIFICATE OF CALIBRATION

CERTIFICATE No.: **SLM 23713 & FILT 4907**

Equipment Description: Sound & Vibration Analyser

Manufacturer: Svantek

Model No: Svan-977 **Serial No:** 59682

Microphone Type: 7052E **Serial No:** 69609

Preamplifier Type: SV12L **Serial No:** 64882

Filter Type: 1/1 Octave **Serial No:** 59682

Comments: All tests passed for class 1.
(See over for details)

Owner: EMM Consulting
Suite 01, 20 Chandos Street
St Leonards NSW 2065

Ambient Pressure: 1001 hPa ± 1.5 hPa

Temperature: 24 °C $\pm 2^\circ$ C **Relative Humidity:** 58% $\pm 5\%$

Date of Calibration: 23/10/2018 **Issue Date:** 23/10/2018

Acu-Vib Test Procedure: AVP10 (SLM) & AVP06 (Filters)

CHECKED BY: *[Signature]*

AUTHORISED SIGNATURE:

Jack Kietl

Accredited for compliance with ISO/IEC 17025 - Calibration
The results of the tests, calibration and/or measurements included in this document are traceable to
Australian/national standards.



ACU-VIB
ELECTRONICS

HEAD OFFICE

Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
Tel: (02) 96808133 Fax: (02) 96808233
Mobile: 0413 809806
web site: www.acu-vib.com.au

Accredited Lab. No. 9262
Acoustic and Vibration
Measurements

Page 1 of 2
AVCERT10 Rev. 1.3 15.05.18

CERTIFICATE OF CALIBRATION

CERTIFICATE No: 26415

EQUIPMENT TESTED: Sound Level Calibrator

Manufacturer: Rion
Type No: NC-74 **Serial No:** 34372752
Owner: EMM Consulting
20 Chandos Street
St Leonards NSW 2065

Tests Performed: Measured output pressure level was found to be:

Parameter	Pre-Adj	Adj Y/N	Output: (db re 20 μ Pa)	Frequency: (Hz)	THD&N (%)
Level 1:	NA	N	94.16	1002.63	4.47
Level 2:	NA	N	NA	NA	NA
Uncertainty:			± 0.11 dB	$\pm 0.05\%$	$\pm 0.20\%$
Uncertainty (at 95% c.l.) k=2					

CONDITION OF TEST:

Ambient Pressure: 1002 hPa ± 1.5 hPa **Relative Humidity:** 56% $\pm 5\%$

Temperature: 24 $^{\circ}$ C $\pm 2^{\circ}$ C

Date of Calibration: 21/02/2020

Issue Date: 24/02/2020

Acu-Vib Test Procedure: AVP02 (Calibrators)

Test Method: AS IEC 60942 - 2017

CHECKED BY: *KB* **AUTHORISED SIGNATURE:** *Jack Kidd*

Accredited for compliance with ISO/IEC 17025 - Calibration

The results of the tests, calibration and/or measurements included in this document are traceable to Australian/national standards.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.



Accredited Lab. 9262
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Measurements



HEAD OFFICE
Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
Tel: (02) 96808133 Fax: (02) 96808233
Mobile: 0413 809806
Web site: www.acu-vib.com.au

17 December 2020

Chris Cooke
Quarry Manager
Hanson Construction Materials Pty Ltd
Level 5, 75 George Street
Parramatta NSW 2150

Ground floor, 20 Chandos Street
St Leonards NSW 2065
PO Box 21
St Leonards NSW 1590

T 02 9493 9500
E info@emmconsulting.com.au
www.emmconsulting.com.au

Re: Quarter 4 - 2020: East Guyong Quarry noise and blast monitoring

1 Introduction

EMM Consulting Pty Ltd (EMM) has been commissioned by Hanson Construction Materials Pty Ltd (NSW) (Hanson) to complete quarterly noise monitoring for the East Guyong Quarry, as required by the site's approved Noise Management Plan. The quarry is located approximately 22 km southeast of Orange, NSW. Operator-attended noise monitoring was undertaken on 26 November 2020.

The following material was referenced as part of this assessment:

- Environment Protection Authority (EPA), *Industrial Noise Policy* (INP) 2000;
- Environment Protection Authority (EPA), *Industrial Noise Policy - Application notes* 2017;
- Environment Protection Authority (EPA), *Noise Policy for Industry* (NPfI) 2017;
- Hanson Construction Materials and R. W. Corkery & Co Pty Limited (RWC), *Noise Management Plan for the East Guyong Quarry* (NMP) – Mod 2 Revision, July 2019;
- Department of Planning and Infrastructure (DP&I), *East Guyong Quarry Project Modification (06_0193 MOD 1) approval* (PA) 2012; and
- Australian and New Zealand Environment Council (ANZEC) 1990, *Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration*.

Analysis of data from one blast event that occurred on 17 November 2020 has also been included in this report.

Several technical terms are discussed in this report and are explained in Appendix A.

2 Methodology

2.1 Site operations

At the time of the attended noise monitoring on 26 November 2020, the quarry's activities comprised of the following:

- extraction of basalt using standard drill, load and haul techniques;
- processing of extracted basalt and stockpiling of material; and
- transportation of quarry products.

The quarry's approved hours of operation are:

- Monday to Friday (non-daylight savings) from 6 am to 6 pm;
- Monday to Friday (daylight savings) from 6 am to 8 pm; and
- Saturdays from 7 am to 1 pm.

Material crushing and screening currently occurs on site from Monday to Thursday. This restriction to approved hours is an operational decision by the quarry and aids in the planning for maintenance and repairs.

2.2 Noise monitoring

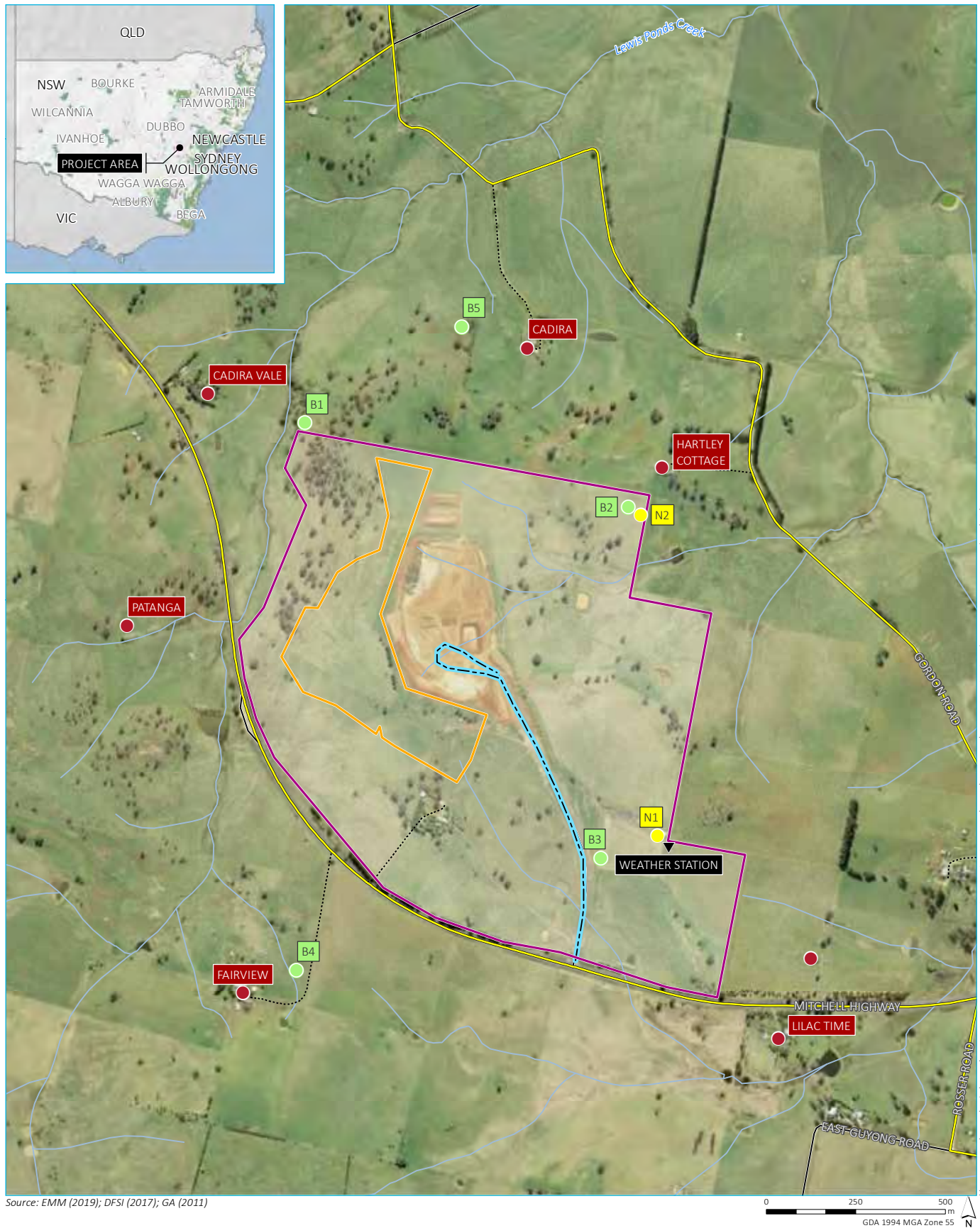
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A Brüel & Kjær 2250 Type 1 sound analyser (s/n 3008201) was used for the noise monitoring. The sound analyser was calibrated before and after the completion of the surveys using a Rion NC74 calibrator (s/n 34372752). The instruments were within a current NATA calibration period at the time of the noise monitoring.

2.3 Assessment locations

The noise monitoring included four 15-minute operator-attended noise measurements during the daytime period on 26 November 2020 to quantify noise emissions from the quarry at locations N1 and N2. Noise monitoring was not conducted prior to 7 am as the quarry was not in operation.

Locations N1 and N2 are near the south-east and north-east boundaries of the site, respectively. Location N1 is approximately 500 m from "Wheatfields", the closest residence situated south-east of the quarry. Location N2 is approximately 150 m from "Hartley Cottage", the closest residence situated north-east of the quarry. These monitoring locations were selected to not inconvenience surrounding residents and are consistent with the approved Noise Management Plan for the East Guyong Quarry (RWC, 2019). Monitoring at these locations, rather than at the residences, also provides a better opportunity to quantify site related noise since they are closer to the operations.



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| ▼ Weather station | — Watercourse/drainage line | |

Site location and monitoring plan

East Guyong Quarry
Noise and blast monitoring
Figure 2.1

3 Criteria

3.1 Operational noise

Condition 3(5) of PA 06_0193 states that the noise assessment criteria are $L_{Aeq,15 \text{ minute}}$ 35 dB at any residence for all assessment periods. The exception is the "Fairview" residence which has a daytime criterion of $L_{Aeq,15 \text{ minute}}$ 36 dB. In accordance with the PA 06_0193, "Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy."

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Where a difference of 15 dB or more between site 'C-weighted' and site 'A-weighted' noise emission levels is identified, the one-third octave noise levels recorded should be compared to the values in Table C2 of the NPfI (EPA 2017), which has been reproduced in Table 3.1 below.

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- where any of the one-third octave noise levels in Table 3.1 are exceeded by more than 5 dB and cannot be mitigated, a 5 dB positive adjustment to measured/predicted A-weighted levels applies for the evening/night period and a 2 dB positive adjustment applies for the daytime period.

Hence, where possible throughout each survey the operator has estimated the difference between site 'C-weighted' and site 'A-weighted' noise emission levels by matching audible sounds with the response of the analyser ($L_{Ceq}-L_{Aeq}$). Where this was deemed to be 15 dB or greater, the measured one-third octave frequencies have been compared to the values in Table 3.1 to identify the relevant modifying factor correction (if applicable). This method has been applied to this assessment as presented in Section 4.

It is of note that the NPfl (EPA 2017) states that low-frequency noise corrections only apply under the standard and/or noise-enhancing (ie applicable) meteorological conditions.

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Blast overpressure and vibration monitoring is managed by Hanson for all blast events. Blast overpressure and ground vibration are monitored at three locations within or at the site's boundary as well as two locations outside of the site's boundary (one south of the Mitchell Highway near the Fairview property and one north of the site near the Cadira property). Monitoring locations are situated closer to blasting locations than the residential structures (refer to Figure 2.1), and therefore overpressure and vibration levels would likely be lower at the actual residential dwellings than those measured.

Blast emissions criteria for the quarry apply at any residence on privately-owned land surrounding the site and are presented in Table 3.2.

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Location	Airblast overpressure criteria (dB (Linear Peak))	Ground vibration criteria (mm/s (Peak velocity))	Allowable exceedance
Any privately-owned residence surrounding the site.	115	5	5% of the total number of blasts in a 12-month period
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4 Results

4.1 Noise monitoring results

Noise monitoring results for locations N1 and N2 are presented in Table 4.1. Data recorded by the site's weather station (shown in Figure 2.1) was used to identify weather conditions during the monitoring period and to determine the applicability of noise limits. Wind speed and direction observations are presented in Table 4.1

Wind speed averages were greater than 3 m/s (at 10 m above ground) during all of the four measurements at N1 and N2; hence noise limits were not applicable during all measurements. Regardless, site noise contribution was below (satisfied) the relevant noise limits during all attended measurements.

Low frequency noise modifying factors, in accordance with fact sheet C2 of the NPfI (EPA 2017), were not applied to any measured site contribution as measured noise levels did not exceed the relevant LFN thresholds.

All quarry contributions measured at locations N1 and N2 satisfied the relevant noise criteria as per the NMP. It is therefore expected that relevant criteria for surrounding residential receivers would also be satisfied.

Based on the preceding information, noise levels from the quarry were expected to satisfy the relevant residential criteria at all assessment locations identified in Condition 3(5) of PA_0193.

Table 4.1 **Attended noise monitoring summary – 26 November 2020**

Location	Start time	Attended noise monitoring results dB						Criteria dB	Meteorological conditions ¹		Criteria Applies? (Y/N)	Exceedance	Comments
		Total measured			Site contribution				Wind speed (m/s)	Wind direction ²			
		L ₉₀	L _{Aeq}	L _{Amax}	LFN mod. factor	L _{Aeq}	L _{Aeq}						
N2	12:55 pm	36	42	75	-	40	50	4.0	237	N	Nil	Quarry dominant throughout measurement including hum of crushing/screening plant, FEL handling material and trucks/machinery traversing. Other ambient noise included frequent, highly variable birdsong and persistent cicada drone.	
N2	12:11 pm	36	39	58	-	39	50	4.3	216	N	Nil	Quarry dominant throughout measurement including hum of crushing/screening plant, FEL handling material and trucks/machinery traversing. Other ambient noise included frequent, highly variable birdsong and persistent cicada drone.	
N1	1:46 pm	37	50	72	-	<37	43	4.2	217	N	Nil	Quarry activities very faintly audible throughout measurement. Other ambient noise included birdsong, persistent cicada drone, foliage rustle, highway traffic (dominant) and two turboprop aircraft fly-bys.	
N1	2:02 pm	39	46	60	-	<39	43	4.3	214	N	Nil	Quarry very faintly audible throughout measurement. Other ambient noise included birdsong, persistent cicada drone, foliage rustle and highway traffic (dominant).	

Notes: 1. Meteorological data was obtained from the site weather station at a height of 10 m above ground.
2. Wind direction reported in degrees from north (0°)
3. N/A = Not Applicable

4.2 Blast overpressure and ground vibration

One blast event occurred at the quarry since the last quarterly noise monitoring in September 2020. The blast overpressure and vibration monitoring results were provided by Hanson and are presented in Table 4.2. The monitoring results show the relevant criteria were satisfied at all monitoring locations (refer to Figure 2.1).

Table 4.2 Blast emissions monitoring results

Date	Monitoring location	Airblast overpressure level (dB(Linear Peak))		Ground vibration - Peak particle velocity (mm/s)	
		Measured	Criteria ²	Measured	Criteria ²
17/11/2020	B1	0 ¹	115	0 ¹	5
	B2	0 ¹	115	0 ¹	5
	B3	99	115	1.12	5
	B4	100	115	0.95	5
	B5	113	115	0.08	5

Notes: 1. There was no trigger for this blasting event.
2. Criteria applies at the nearest residential location and not at the monitoring location.

5 Conclusion

EMM has completed an assessment of noise and blasting emissions from East Guyong Quarry operations. Noise monitoring was undertaken at locations around the site on 26 November 2020 as required by, and in accordance with, the site's approved NMP.

The results demonstrated that the received site noise levels at all monitoring locations satisfied the relevant noise criteria as per the PA_0193 and in accordance with the NMP for the East Guyong Quarry.

Therefore, it is concluded that noise levels from quarry operations satisfied the relevant criteria at all assessment locations identified in Condition 3(5) of PA_0193.

The blast overpressure and ground vibration monitoring results satisfied the relevant criteria at all monitoring locations for the one blast events that have been assessed.

Yours sincerely



Oliver Janev

Acoustic Engineer

ojanev@emmconsulting.com.au

Review: Katie Teyhan 17/12/2020

Appendix A

Glossary of acoustic terms

A number of technical terms are required for the discussion of noise. These are explained in Table A.1.

Table A.1 **Glossary of acoustic terms**

Term	Description
dB	Noise is measured in units called decibels (dB).
A-weighting	There are several scales for describing noise, the most common being the 'A-weighted' scale. This is an adjustment made to sound-level measurement to approximate the response of the human ear.
C-weighting	This is an adjustment made to sound-level measurements which takes account of low-frequency components of noise within the audibility range of humans.
L _{A90}	Commonly referred to as the background noise level. The A-weighted noise level exceeded 90% of the time.
L _{Aeq}	The A-weighted, energy average noise from a source. This is the equivalent continuous sound pressure level over a given period. The L _{Aeq} (15-min) descriptor refers to an L _{Aeq} noise level measured over a 15-minute period.
L _{Amax}	The A-weighted maximum root mean squared sound pressure level received during a measuring interval.
Day period	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening period	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night period	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 pm.
L _{peak}	The maximum instantaneous sound pressure during a measurement period or noise event.
PPV	The greatest instantaneous particle velocity during a given time interval.

It is useful to have an appreciation of decibels, the unit of noise measurement. Table A.2 gives an indication as to what an average person perceives about changes in noise levels:

Table A.2 **Perceived change in noise**

Change in sound level (dB)	Perceived change in noise
1 to 2	typically indiscernible
3	just perceptible
5	noticeable difference
10	twice (or half) as loud
15	large change
20	four times (or quarter) as loud

Examples of common noise levels are provided in Figure A.1.

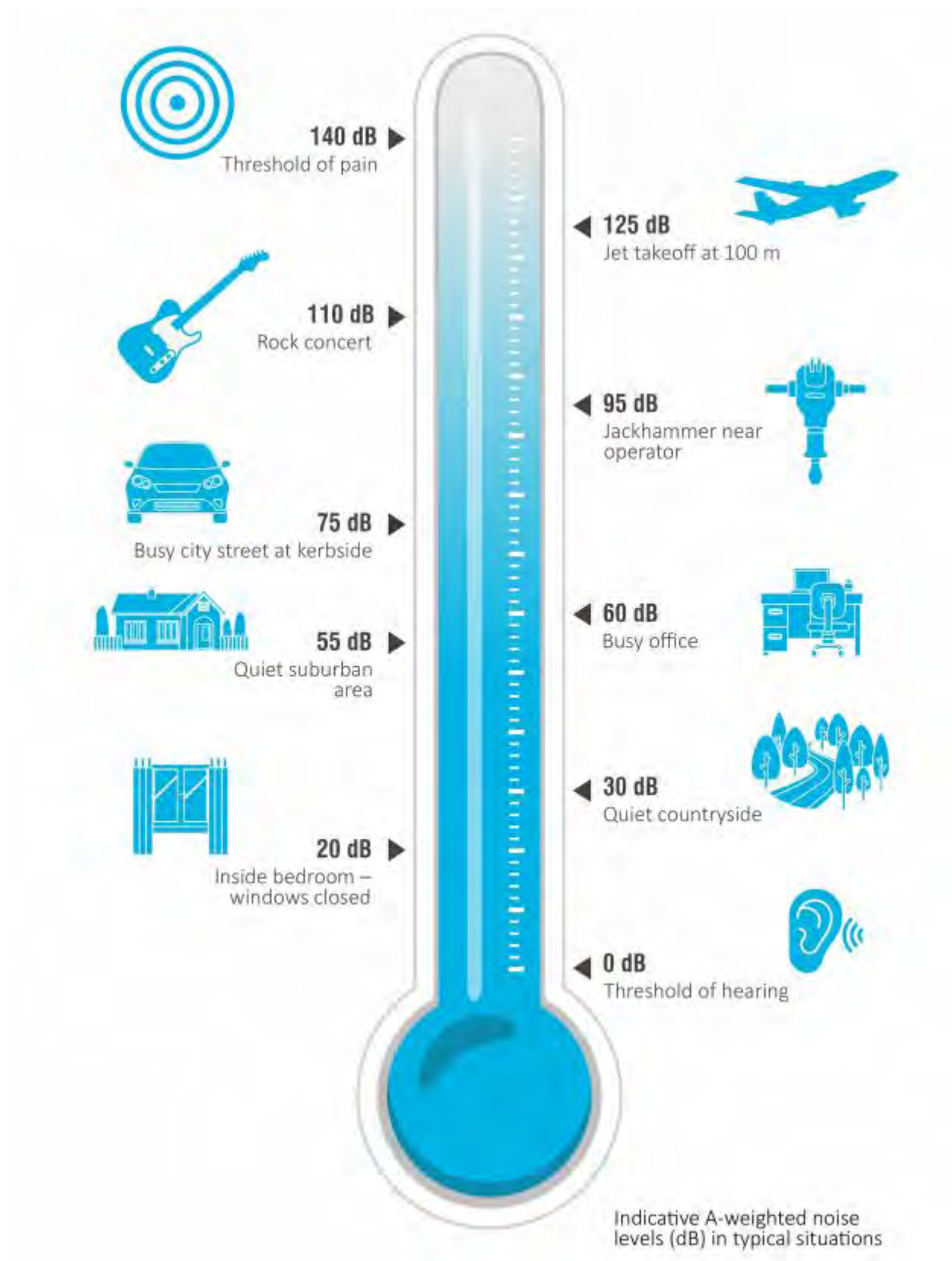


Figure A.1 Common noise levels

Appendix B

Calibration certificates

CERTIFICATE OF CALIBRATION

CERTIFICATE No.: **SLM 25410 & FILT 5368**

Equipment Description: Sound Level Meter

Manufacturer: B & K

Model No: 2250 **Serial No:** 3008201

Microphone Type: B&K 4189 **Serial No:** 2983733

Preamplifier Type: B&K ZC0032 **Serial No:** 22666

Filter Type: 1/3 Octave **Serial No:** 3008201

Comments: All tests passed for class 1.
(See over for details)

Owner: EMM Consulting
Ground Floor, Suite 01, 20 Chandos St
St Leonards NSW 2065

Ambient Pressure: 1002 hPa ± 1.5 hPa

Temperature: 23 °C $\pm 2^\circ$ C **Relative Humidity:** 29% $\pm 5\%$

Date of Calibration: 21/08/2019 **Issue Date:** 21/08/2019

Acu-Vib Test Procedure: AVP10 (SLM) & AVP06 (Filters)

CHECKED BY: *LAB*

AUTHORISED SIGNATURE: *Hein Soc*

Accredited for compliance with ISO/IEC 17025 - Calibration
The results of the tests, calibration and/or measurements included in this document are traceable to
Australian/national standards.



ACU-VIB
ELECTRONICS

HEAD OFFICE

Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
Tel: (02) 96808133 Fax: (02) 96808233
Mobile: 0413 809806
web site: www.acu-vib.com.au

Accredited Lab. No. 9262
Acoustic and Vibration
Measurements

Page 1 of 2
AVCERT10 Rev. 1.3 15.05.18

CERTIFICATE OF CALIBRATION

CERTIFICATE No: 26415

EQUIPMENT TESTED: Sound Level Calibrator

Manufacturer: Rion
Type No: NC-74 **Serial No:** 34372752
Owner: EMM Consulting
20 Chandos Street
St Leonards NSW 2065

Tests Performed: Measured output pressure level was found to be:

Parameter	Pre-Adj	Adj Y/N	Output: (db re 20 μ Pa)	Frequency: (Hz)	THD&N (%)
Level 1:	NA	N	94.16	1002.63	4.47
Level 2:	NA	N	NA	NA	NA
Uncertainty:			± 0.11 dB	$\pm 0.05\%$	$\pm 0.20\%$
Uncertainty (at 95% c.l.) k=2					

CONDITION OF TEST:

Ambient Pressure: 1002 hPa ± 1.5 hPa **Relative Humidity:** 56% $\pm 5\%$

Temperature: 24 $^{\circ}$ C $\pm 2^{\circ}$ C

Date of Calibration: 21/02/2020

Issue Date: 24/02/2020

Acu-Vib Test Procedure: AVP02 (Calibrators)

Test Method: AS IEC 60942 - 2017

CHECKED BY: *KB* **AUTHORISED SIGNATURE:** *Jack Kidd*

Accredited for compliance with ISO/IEC 17025 - Calibration

The results of the tests, calibration and/or measurements included in this document are traceable to Australian/national standards.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.



Accredited Lab. 9262
Acoustic and Vibration
Measurements



HEAD OFFICE
Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
Tel: (02) 96808133 Fax: (02) 96808233
Mobile: 0413 809806
Web site: www.acu-vib.com.au

APPENDIX 5

Groundwater Quality Monitoring Report

Our Ref: 213055_REP_007.docm

4 March 2021

Compliance Officer
Hanson Construction Materials
3410 Mitchell Highway
EAST GUYONG NSW 2798

Attention: Mr Chris Cooke, Quarry Manager

GROUNDWATER MONITORING – JANUARY 2021 EAST GUYONG QUARRY

This letter summarises the results of the groundwater gauging and sampling round undertaken by Premise on 28 January 2021.

The routine monitoring undertaken included groundwater level measurements and sampling at four of the five monitoring piezometers. Monitoring point BH5 in the south-west of the site, could not be located and may have been damaged by farming activities.

Groundwater Levels

Groundwater levels were recorded at monitoring stations BH1, BH2, BH3 and BH4. The location of each groundwater monitoring station is shown as an attachment. The groundwater level measurements are also provided as an attachment in **Table 1** and are illustrated below in **Figure 1**.

Standing water levels indicated that BH1 (920.59 mAHD) is the highest in standing water level. BH4 was the lowest of the monitoring points (at 893.59 mAHD). Variation in standing water levels was apparent as an average fall of 1.71 m since September 2020. The range in groundwater elevation across the site in January 2021 was calculated to be 27.0 m.

Recorded groundwater levels tended to be within historical ranges, and quarterly monitoring trends indicate influence by local meteorological conditions.

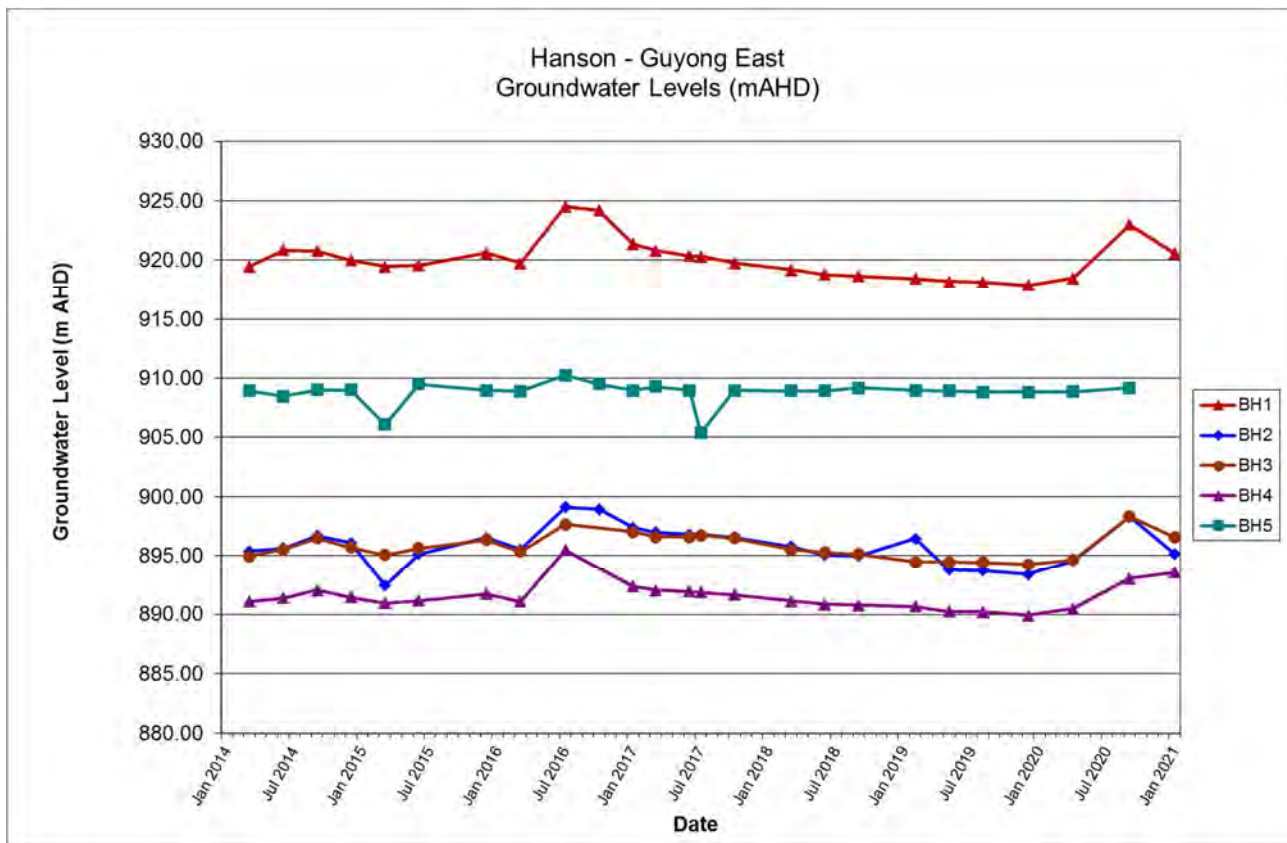


Figure 1 –Groundwater Elevations

Groundwater Quality

Groundwater samples were obtained from monitoring stations BH1, BH2, BH3, BH4 and BH5 on 28 January 2021 and were analysed for the annual suite of parameters. The groundwater quality results are summarised in the attached **Table 2**.

Observations are as follows:

- Laboratory measured pH was slightly alkaline, with values ranging from 7.54 at BH1 to 8.10 at BH3 and BH4. Values were suitable for livestock drinking water, with all values falling within the guideline range of 6.5 to 8.5 pH units (Markwick, 2007).
- Electrical conductivity (EC) ranged from 389 $\mu\text{S}/\text{cm}$ at BH1 to 738 $\mu\text{S}/\text{cm}$ at BH3. The corresponding total dissolved solids (TDS) concentrations ranged from 261 mg/L at BH1 to 494 mg/L at BH3, and considered suitable for consumption by the most susceptible livestock category, poultry (<3,000 mg/L, ANZECC & ARMCANZ, 2000).
- Total alkalinity concentrations ranged from 205 mgCaCO₃/L at BH4 to 398 mgCaCO₃/L at BH3. Alkalinity of groundwater was higher than the guideline hardness value for potential fouling of waters (350 mg/L, ANZECC & ARMCANZ, 2000) at piezometers BH2 and BH3.
- Sulfate was low, with detections ranging up to 8 mg/L at BH3. The guideline value for livestock drinking water is 1,000 mg/L (ANZECC & ARMCANZ, 2000).
- Chloride was measured to be the highest at BH3, at a concentration of 13 mg/L, which was lower than the guideline value for irrigation of saline sensitive crops (175 mg/L, ANZECC & ARMCANZ, 2000).

- Calcium concentrations were all significantly lower than the livestock drinking water guideline value of 1000 mg/L (ANZECC & ARMCANZ, 2000). Monitoring location BH3 recorded the highest concentration at 46 mg/L.
- Magnesium ranged from 20 mg/L (BH1) to 56 mg/L (BH3). These records are consistent with historical results.
- Sodium was recorded to be lowest at BH4 (15 mg/L) and highest at BH3 (28 mg/L). These values are below the conservative aesthetic guideline for human drinking water (180 mg/L, NHMRC & NRMMC, 2015) and the guideline for irrigation of saline sensitive crops (115 mg/L, ANZECC & ARMCANZ, 2000).
- Potassium concentrations ranged up to 28 mg/L at BH3.
- Arsenic was below the laboratory limit of reporting (LOR) of 0.001 mg/L at BH1. Other concentrations ranged up to 0.060 mg/L at BH2, which is below the long-term irrigation guideline value of 0.1 mg/L (ANZECC & ARMCANZ, 2000).
- Manganese in groundwater ranged from 0.001 mg/L at BH2 to 0.757 mg/L at BH1. The long-term (<100 years) crop irrigation guideline value of 0.2 mg/L (ANZECC & ARMCANZ, 2000) was exceeded at location BH1; all concentrations were below the short-term (<20 years) guideline value of 10 mg/L.
- Iron in groundwater ranged from below the laboratory LOR of 0.05 mg/L at BH2, BH3 and BH4, to 0.23 mg/L at BH1. The long-term (<100 years) crop irrigation guideline value of 0.2 mg/L (ANZECC & ARMCANZ, 2000) was exceeded at location BH1; all concentrations were below the short-term (<20 years) guideline value of 10 mg/L.
- Ammonia concentrations were recorded to range from less than the laboratory LOR of 0.01 mgN/L at locations BH2, BH3, to 1.28 mgN/L at BH1. The maximum concentration recorded at monitoring point BH1 exceeded the conservative aesthetic guideline for ammonia in human drinking water (0.41 mgN/L, NHMRC & NRMMC, 2015). All other samples were below the guideline and suitable for human consumption.
- Nitrite was detected in groundwater at monitoring points BH1 and BH3 at respective concentrations of 0.01 mgN/L and 0.05 mgN/L. All results were below the livestock drinking water guideline value of 9.12 mgN/L (ANZECC & ARMCANZ, 2000).
- Nitrate was lowest at BH1 (0.12 mgN/L) and highest at BH2 (4.94 mgN/L). Results are below the livestock drinking water guideline value for nitrate (90.29 mg/L, ANZECC & ARMCANZ, 2000).
- Total kjeldahl nitrogen (TKN) in groundwater ranged from 0.6 mgN/L at BH2 to 4.2 mgN/L at BH1. Total nitrogen concentrations in groundwater ranged from 1.4 mg/L at BH4 to 5.5 mg/L at BH2. All total nitrogen concentrations were indicative of groundwater suitable for short-term irrigation (<20 years, ANZECC & ARMCANZ, 2000). The total nitrogen concentration in groundwater at BH1, BH3 and BH4 was also considered suitable for long-term irrigation (<100 years, ANZECC & ARMCANZ, 2000).
- Total phosphorus ranged from 0.1 mg/L at BH2 to 0.99 mg/L at BH1. Phosphorus concentrations in groundwater at all monitoring points exceeded the long-term irrigation (<100 years) guideline value of 0.05 mg/L (ANZECC & ARMCANZ, 2000).

Conclusions

The January 2021 groundwater monitoring round conducted by Premise at the East Guyong Quarry indicates an overall fall in groundwater levels from those recorded in September 2020. Groundwater level measurements continue to indicate that monitoring point BH1 to the south is the most up-gradient monitoring point and BH4 in the site's north-west had the lowest groundwater elevation.

pH and electrical conductivity continue to be monitored quarterly and generally remained steady. The majority of parameters were observed to be below relevant guideline values. There were generally minimal variances in monitored parameter concentrations in groundwater in January 2021 from those previously recorded in December 2019, with the following exceptions:

- Chloride at BH1 decreased from 43 mg/L to 4 mg/L
- Sodium at BH1 decreased from 37 mg/L to 17 mg/L
- Manganese at BH1 decreased from 1.49 mg/L to 0.757 mg/L
- Iron at BH1 decreased from 2.94 mg/L to 0.23 mg/L
- Ammonia at BH1 increased from 0.67 mgN/L to 1.28 mgN/L
- Nitrate at BH4 decreased from 2.28 mgN/L to 0.24 mgN/L
- TKN at BH1 increased from 2.1 mgN/L to 4.2 mgN/L
- Total nitrogen at BH1 increased from 2.2 mg/L to 4.3 mg/L
- Phosphorus at BH1 decreased from 1.4 mg/L to 0.59 mg/L

The next round of routine groundwater monitoring is the quarterly round scheduled for April 2021 (groundwater levels, pH and EC only).

An assessment of monitoring point BH5 – which was not located during the January 2021 field activities – should be conducted to determine the viability of this point for future monitoring rounds.

Please do not hesitate to contact Premise with any questions or comments you may have regarding this report.

Yours sincerely



BRENDAN STUART
Environmental Scientist

No. of Attachments – 4:

Figure 1 – Location of Environmental Monitoring Stations
Table 1 – Groundwater Elevation Data
Table 2 – Results of Laboratory Analysis – January 2021
ALS Environmental Laboratory Report – January 2021

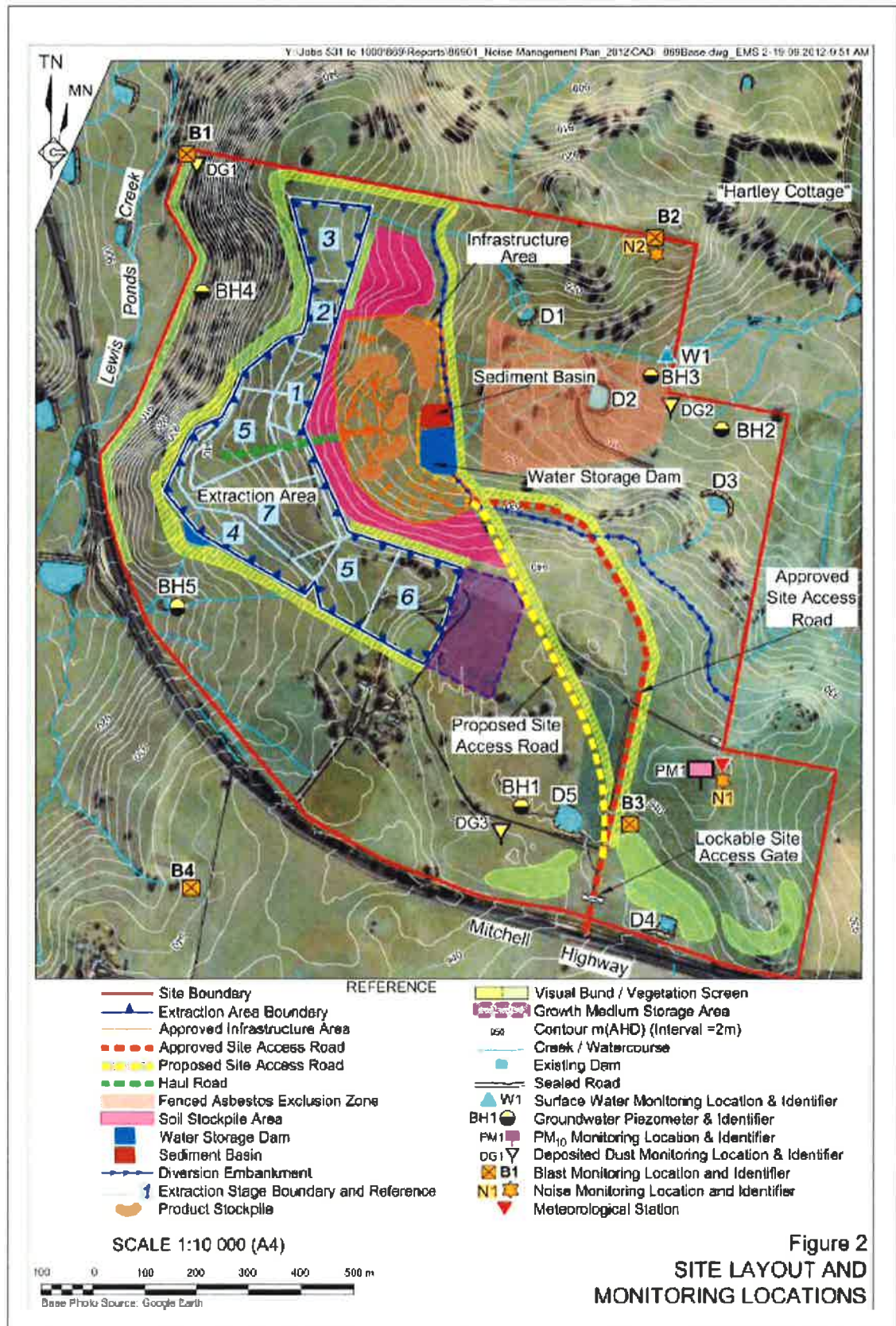


Figure 2: Project Map (source: RW Corkery Pty Ltd).

TABLE 1 EAST GUYONG QUARRY- GROUNDWATER LEVELS

Piezometer Details:

	Ground	Stickup
BH1	927.80	0.50
BH2	899.31	0.60
BH3	899.94	0.50
BH4	897.44	0.50
BH5	910.61	0.50

Definitions:

Stickup:	Height of piezometer pipe above ground surface
Ground Elevation:	Actual elevation of ground at the piezometer relative to an arbitrary datum. All ground elevations are measured to the same datum, hence piezo GWLs are relative to each other.
GWL:	Actual elevation of groundwater at the piezometer relative to an arbitrary datum.
Measured:	Depth of groundwater measured from the top of the bore casing.
NMWL:	No measureable water level.
NR	Level unable to be recorded

Date	BH1		BH2		BH3		BH4		BH5	
	Measured	GWL (m AHD)	Measured	GWL (m AHD)	Measured	GWL (m AHD)	Measured	GWL (m AHD)	Measured	GWL (m AHD)
26-Mar-14	8.81	919.49	4.53	895.38	5.49	894.95	6.83	891.11	2.17	908.94
25-Jun-14	7.45	920.85	4.28	895.63	4.90	895.54	6.55	891.39	2.65	908.46
08-Sep-14	7.52	920.78	3.22	896.69	3.95	896.49	5.90	892.04	2.10	909.01
18-Dec-14	8.30	920.00	3.82	896.09	4.71	895.73	6.49	891.45	2.13	908.98
18-Mar-15	8.83	919.47	7.46	892.45	5.36	895.08	7.00	890.94	5.01	906.10
22-Jun-15	8.73	919.57	4.75	895.16	4.81	895.63	6.79	891.15	1.63	909.48
07-Dec-15	7.68	920.62	3.37	896.54	4.10	896.34	6.21	891.73	2.15	908.96
30-Mar-16	8.53	919.77	4.38	895.53	5.10	895.34	6.86	891.08	2.22	908.89
26-Jul-16	3.77	924.53	0.80	899.11	2.79	897.65	2.43	895.51	0.87	910.24
27-Oct-16	4.12	924.18	0.96	898.95	NR		NR		1.61	909.50
31-Jan-17	6.96	921.34	2.52	897.39	3.43	897.01	5.57	892.37	2.16	908.95
27-Mar-17	7.47	920.83	2.92	896.99	3.85	896.59	5.88	892.06	1.83	909.28
19-Jun-17	7.95	920.35	3.10	896.81	3.85	896.59	6.00	891.94	2.15	908.96
13-Jul-17	7.99	920.31	3.10	896.81	3.70	896.74	6.05	891.89	5.74	905.37
26-Oct-17	8.53	919.77	3.35	896.56	3.96	896.48	6.27	891.67	2.14	908.97
01-Mar-18	9.10	919.20	4.11	895.80	4.90	895.54	6.80	891.14	2.20	908.91
12-Jun-18	9.49	918.81	4.85	895.06	5.14	895.30	7.10	890.84	2.20	908.91
13-Sep-18	9.66	918.64	4.90	895.01	5.30	895.14	7.17	890.77	1.93	909.18
18-Feb-19	9.87	918.43	3.45	896.46	5.96	894.48	7.28	890.66	2.15	908.96
23-May-19	10.11	918.19	6.13	893.78	5.97	894.47	7.70	890.24	2.20	908.91
26-Aug-19	10.17	918.13	6.17	893.74	5.99	894.45	7.74	890.20	2.28	908.83
03-Dec-19	10.42	917.88	6.51	893.40	6.20	894.24	8.01	889.93	2.29	908.82
24-Apr-20	9.81	918.49	5.32	894.59	5.81	894.63	7.46	890.48	2.26	908.85
23-Sep-20	5.30	923.00	1.59	898.32	2.10	898.34	4.88	893.06	1.92	909.19
28-Jan-21	7.71	920.59	4.75	895.16	3.89	896.55	4.35	893.59	NR	

TABLE 2 EAST GUYONG QUARRY - RESULTS OF FIELD ANALYSIS - JANUARY 2021

Analyte	Units	Groundwater				
		BH1	BH2	BH3	BH4	BH5
Temperature (field)	°C	14.4	15.7	14.4	15.2	-
pH (lab)	pH units	7.54	8.07	8.1	8.1	-
pH (field)	pH units	7.96	8.94	7.79	8.09	-
Elect. Cond (lab)	µS/cm	389	656	738	396	-
Elect. Cond (field)	µS/cm	495	118	800	710	-
Hydroxide Alkalinity	mgCaCO ₃ /L	<1	<1	<1	<1	-
Carbonate Alkalinity	mgCaCO ₃ /L	<1	<1	<1	<1	-
Bicarbonate Alkalinity	mgCaCO ₃ /L	223	355	398	205	-
Total Alkalinity	mgCaCO ₃ /L	223	355	398	205	-
Sulfate	mg/L	<10	3	8	4	-
Chloride	mg/L	4	12	13	12	-
Calcium	mg/L	41	35	46	30	-
Magnesium	mg/L	20	54	56	29	-
Sodium	mg/L	17	18	28	15	-
Potassium	mg/L	5	4	28	7	-
Arsenic	mg/L	<0.001	0.06	0.004	0.001	-
Manganese	mg/L	0.757	0.001	0.009	0.011	-
Iron	mg/L	0.23	<0.05	<0.05	<0.05	-
Ammonia (as N)	mgN/L	1.28	<0.01	<0.01	0.04	-
Nitrite (as N)	mgN/L	0.01	<0.01	0.05	<0.01	-
Nitrate (as N)	mgN/L	0.12	4.94	3.26	0.24	-
Nitrite + Nitrate (as N)	mgN/L	0.13	4.94	3.31	0.24	-
Total Kjeldahl Nitrogen (as N)	mgN/L	4.2	0.6	1.2	1.2	-
Total Nitrogen (as N)	mgN/L	4.3	5.5	4.5	1.4	-
Total Phosphorus (as P)	mgP/L	0.99	0.1	0.48	0.24	-
Total Anions	meq/L	4.57	7.49	8.48	4.52	-
Total Cations	meq/L	4.56	7.08	8.84	4.72	-
Ionic Balance	%	0.1	2.87	2.04	2.14	-

CERTIFICATE OF ANALYSIS

Work Order : **ES2103266**
Client : **PREMISE NSW Pty Ltd**
Contact : **B STUART**
Address : **154 Peisley St, Orange NSW 2800**
Telephone : **----**
Project : **213055 / Hanson**
Order number : **----**
C-O-C number : **----**
Sampler : **Isaac Westcott**
Site : **----**
Quote number : **EN/222**
No. of samples received : **4**
No. of samples analysed : **4**

Page : 1 of 4
Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 02-Feb-2021 09:00
Date Analysis Commenced : 02-Feb-2021
Issue Date : 08-Feb-2021 17:07



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dian Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- ED041G: LOR raised for Sulfate on sample 1 due to sample matrix.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH1	BH2	BH3	BH4	----
Sampling date / time					29-Jan-2021 00:00	29-Jan-2021 00:00	29-Jan-2021 00:00	29-Jan-2021 00:00	----
Compound	CAS Number	LOR	Unit		ES2103266-001	ES2103266-002	ES2103266-003	ES2103266-004	-----
					Result	Result	Result	Result	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		7.54	8.07	8.10	8.10	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		389	656	738	396	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		223	355	398	205	----
Total Alkalinity as CaCO3	----	1	mg/L		223	355	398	205	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		<10	3	8	4	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		4	12	13	12	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		41	35	46	30	----
Magnesium	7439-95-4	1	mg/L		20	54	56	29	----
Sodium	7440-23-5	1	mg/L		17	18	28	15	----
Potassium	7440-09-7	1	mg/L		5	4	28	7	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	0.060	0.004	0.001	----
Manganese	7439-96-5	0.001	mg/L		0.757	0.001	0.009	0.011	----
Iron	7439-89-6	0.05	mg/L		0.23	<0.05	<0.05	<0.05	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		1.28	<0.01	<0.01	0.04	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		0.01	<0.01	0.05	<0.01	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		0.12	4.94	3.26	0.24	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		0.13	4.94	3.31	0.24	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		4.2	0.6	1.2	1.2	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		4.3	5.5	4.5	1.4	----



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

				Sample ID	BH1	BH2	BH3	BH4	----
				Sampling date / time	29-Jan-2021 00:00	29-Jan-2021 00:00	29-Jan-2021 00:00	29-Jan-2021 00:00	----
Compound	CAS Number	LOR	Unit		ES2103266-001	ES2103266-002	ES2103266-003	ES2103266-004	-----
					Result	Result	Result	Result	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.99	0.10	0.48	0.24	----
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		4.57	7.49	8.48	4.52	----
∅ Total Cations	----	0.01	meq/L		4.56	7.08	8.84	4.72	----
∅ Ionic Balance	----	0.01	%		0.10	2.87	2.04	2.14	----

APPENDIX 6

Minutes of East Guyong Quarry Community Consultative Committee

EAST GUYONG QUARRY COMMUNITY CONSULTATIVE COMMITTEE (EGQCCC)

MEETING NO. 02_2020

Tuesday 10th November 2020

LOCATION

East Guyong Site Office
3410 Mitchell Hwy
East Guyong NSW 2798

INVITED (EGQCCC)

Mr	George Blackwell	(GB)	Chair
Ms	Heather Nicholls	(HN)	Deputy General Manager – Cabonne Services
Mr	Christopher Eldred	(CE)	Department Leader - Development Services Cabonne
Mr	Mark Holman	(MH)	Community Member – “Dargo”
Mr	Tony Gordon	(TG)	Community Member – “Godolphin”
Mr	Steve Harris	(SH)	Community Member – “Fairview”
Mr	Jason Brown	(JB)	Hanson Area manager west
Mr	Chris Cooke	(CC)	Hanson Quarry manager west
Ms	Belinda Pignone	(BP)	Hanson Environment and Compliance Coordinator
Mr	Josh Coops	(JC)	Hanson quarry supervisor

APOLOGIES

Ms	Heather Nicholls	(HN)	Cabonne Shire Council
----	------------------	------	-----------------------

INVITED (OTHER)

MEETING START TIME

3.00pm

ITEM NO	DISCUSSION POINT		ACTION/CLOSE OUT	DA
1.	Welcome			
	– Chair - Welcome to the meeting.	GB		
2.	Apologies			
	Heather Nicholls			
3.	Confirmation of the Minutes of the Previous Meeting			
4.	Business Arising from the previous minutes			
5.	Introductions			

6.	East Guyong Quarry Operations update			
	Update on 2020 – - General forecast sales and production, - Production volumes - Sales volumes - Blasting - 13 production blasts for the year, one exceedance in January. - Video of last blast. - Water, discharge results - Site Solar Bore, 6 Mg has been drawn this year, turned off 31.3.20. - Groundwater information. - Dust. - Noise. - No Natural Occurring Asbestos detected. - Environmental - Tree planting - Resource Regulator announced audit 22nd Sept., 4 x section 191 improvement notices. - Guarding (ongoing) - Update “Dust and other airborne contaminants” (addressed) - Update “Health control plan” (addressed) - Update “Traffic management plan” (addressed) 3 x section 23 notice of concern - Spillage (ongoing) - Excavator, battery box and isolator (addressed) - Covid screening (addressed) <u>Complaints/Correspondence</u> - Heather Nicholls - email on management structure. - Email from Jennifer Rowe DPIE	JB CC BP CC		
7.	General Business			
	“Hillview” new owners haven’t met yet. “Niela park” new owner Cameron Mclvor Any further items from the group.	CC		20 19
8.	Next Meeting			
	Tuesday March 9th 2021			20 19

MEETING CLOSED

pm

East Guyong Quarry CCC 2020 Meeting - Six Month Update

Quarry Environmental Update

Landscape and Rehabilitation

The expansion of the extraction area (2019 Modification 2) has begun with stripping beginning on the west side of the pit (indicated below).



Figure 1: extraction area expansion at East Guyong Quarry. Blue outline is the original extraction area, green shaded area is the expansion of the extraction area (approved 2019).

As required within the site's Aboriginal Cultural Heritage Management Plan, prior to commencement of works within the expanded extraction area, a sites officer or suitably qualified

person was engaged to inspect the surface for Aboriginal objects which may have become visible since the original inspection in 2002. Orange Local Aboriginal Land Council (Orange LALC) was contacted with a site's officer performing the inspection 8 April 2020. No artefacts were found on the site, report still to be finalised by Orange LALC.

Water Monitoring

There has been no water discharge since last CCC meeting. Recent rain has indicated that discharge might be required (see Figure 2). Due to the dam being filled from recent rain, operations have relied on dam water with the groundwater solar bore not in use since March 2020. Total of 57,235 m³ (57.24ML) has been pumped since December 2017. The site's water licence has an entitlement of 40 ML to be used annually.



Figure 2: Picture of water storage dam taken 14 April 2020

The weather station has experienced some faults in 2020, specifically around the rainfall gauge not logging rainfall amounts correctly. The faulty section of the rainfall gauge (reed switch) is awaiting a replacement, which should be completed by the end of April.

Air Quality Monitoring

- PM10 monitoring – monitor has been installed have running correctly in 2020. Exceedances experienced were sourced from bushfire smoke in the early period of 2020. There have been no exceedances since major bushfires were contained and brought under control in NSW.
- Dust Monitoring – High results obtained for the fourth quarter of 2019 and first quarter of 2020. The high levels are contributed to dust storms and smoke experienced in the area.

Asbestos Monitoring

Asbestos monitoring results have come back OK – report attached. Rock drilling asbestos testing found nil asbestos in samples – report attached.

In regards to fibre numbers found in previous asbestos monitoring, monitoring levels are the same as to levels tested before operations started at East Guyong. These original monitoring results have been attached for comparison. It's important to note that the fibre numbers are below monitoring criteria and, as specified within the Australian Standard requirements of Asbestos monitoring, not a risk to persons in and around the site.

Noise Monitoring

No exceedances occurred during quarterly noise monitoring. Reports attached.

Blast Monitoring

There was an exceedance, which reported to EPA and the Department of Planning, Industry and Environment. Letter response below.

"The Department considers that the exceedance was directly attributed to the blast event.

At this stage no further action is required.

The Department will review at the end of the reporting period to ensure compliance against Schedule 3 Condition 8 of the Consent 06_0193. Specifically to confirm that you are within the allowed 5% of total blasts between 115 and 120dBL for the reporting period."

If a blast registers between 115dBL and 120dBL it is considered an exceedance only if the percentage of total blasts between 115 and 120dBL within the year exceed 5%. Unfortunately this is the case for this one blast for 2019. The blast exceedance is reported within the Annual Review, which will be available on the site's website once DPIE have completed their review.

General Business

Production and Sales

Sales down 50%, Production to match Sales where possible crushing 2 or 3 days a week.

Investigating import of conditioned Flyash from Mt Piper to add to roadbase, replacement for plasticity at 5%

Some road projects still going ahead but delayed.

- Rms Work on Mitchell Hwy at Quarry
- Some local subdivisions

Staffing Update

- James Sutherland back from 9 months army reserves in Iraq started back 6th January.
- James called back to reserves for the bush fire crisis 13th Jan. back 3rd Feb.
- James called back to Reserves 23rd March for the Corona virus.
- Ross Chapman Excavator operator left Hanson to go FIFO Qld mine.

Staff reduction due to downturn.

- James Sutherland - Leave without pay - Away army reserves for COVID-19.
- Ross Chapman - not replaced.
- All staff wages and salaries to have 1 day a week off to reduce costs.

No mine inspector visits

APPENDIX 7

Heritage Reports



2020

Aboriginal Cultural Heritage Investigation: East Guyong Quarry – Expanded Pit Area.



Prepared by Lisa Paton on behalf of Site
Officer Ian Sutherland
For Hanson Construction Materials Pty Ltd
& Orange Local Aboriginal Land Council

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Summary

Orange Local Aboriginal Land Council has been engaged by Hansen Construction Materials Pty Ltd as part of undertaking an Aboriginal Cultural Heritage Investigation for the proposed expanded pit area for the East Guyong Quarry at East Guyong in Cabonne Shire NSW.

This investigation aims to identify and inform Hansen Construction Materials Pty Ltd of any additional Aboriginal cultural heritage located within the project area, since the original inspection in 2002.

A search of the Aboriginal Heritage Information Management System did not show any registered Aboriginal sites within the investigation area, or within a 1000 metre buffer of the area.

An Aboriginal Cultural Heritage project site visit was completed on 8th April 2020, by Ian Sutherland. During this investigation four probable culturally modified trees were identified close to the proposed quarry extension.

Location of Investigation Area

The investigation area is located within the Cabonne Local Government Area (LGA), Parish of Colville, County of Bathurst. The quarry is located near the historical village of Guyong. (DP 854608)



Figure 1: Location of Eat Guyong Quarry

(Hanson | Aboriginal Cultural Heritage Management Plan)

Historical Summary

The landscape for the East Guyong Quarry, forms part of the footprint of the Wiradjuri Aboriginal people. It is generally understood that the Cabonne, Orange and Blayney Regions were inhabited by the Wiradjuri people. The neighbouring landscape includes the Wambool (Meandering) or Macquarie River and Belubula river ("stony river" or "big lagoon"), and their creeks and ephemeral waterways, these rivers likely being a significant part of the day to day life of the local Aboriginal communities.

Limited archaeological surveys have been carried out in this district. However, additional surveys are likely to reveal more sites. Some of the types of sites that have been identified in the nearby area are open camp sites with evidence of stone artefacts and hearths, commonly found in the area are traditionally scarred tree. (Pearson 1981).

Within the Orange District some of the important living places have been identified through Archaeological surveys. In the vicinity of Suma Park Reservoir which has dammed the water of Summer Hill Creek being a tributary of the Macquarie River, numerous artefacts have been found. In the district of Browns Creek at Lewis Ponds other significant sites have been found including a burial site and artefact scatters. On the slopes and ridges overlooking the creek, several campsites were identified by archaeologists (Pearson 1981).

Nearby Kings Plains is a significant element of the local and broader Aboriginal cultural landscape within the Cabonne, Blayney and Orange region, an area with widespread accounts of Aboriginal inhabitancy (Pardoe and Webb 1986; Pearson 1981).

The sites currently recorded consist of culturally modified trees, stone artefact scatters, rock art, stone quarries, burials, and potential archaeological deposits.

In the Orange region there is evidence of continued activity of Aboriginal people including that of Boree and Bogan tribes. In the mid 1840's with several documented accounts including that of a great battle between the two tribes at Kerr's Flat(Wellwood) which was recounted in the Country Life Stock and Station Journal (Sydney, NSW : 1924 - 1925) Fri 22 Aug 1924. These tribes would likely have utilised the resources in the quarry site area.

The Macquarie and nearby Belubula Rivers' being the main waterways in the OLALC boundary. The Macquarie River runs generally North West The Belubula , runs approximately east-west, the origins of the Belubula River are at Kings Plains. This waterway is traditionally linked to the Billabearra (Belubula tribe) (Pearson 1984: 65), including "Tibaroo – Chief of the Belubla" who is mentioned on a copper plate presented to him by the New South Wales Government some time during the 19th century (Peak Hill Express 6 September 1907: 6).

At the time of contact with Europeans the headwaters of the Belubula were frequented by the *Muc-are* (Kings Plain tribe) (Pearson 1984: 65), this tribe may well have inhabited or visited the investigation area given its close proximity. The Belubula River remains particularly significant to the Aboriginal community.

There have been many sites found in the local and broader area however the number of cultural surveys that have been carried out have been limited due to financial constraints, this does not reflect the potential of further sites right across the region.

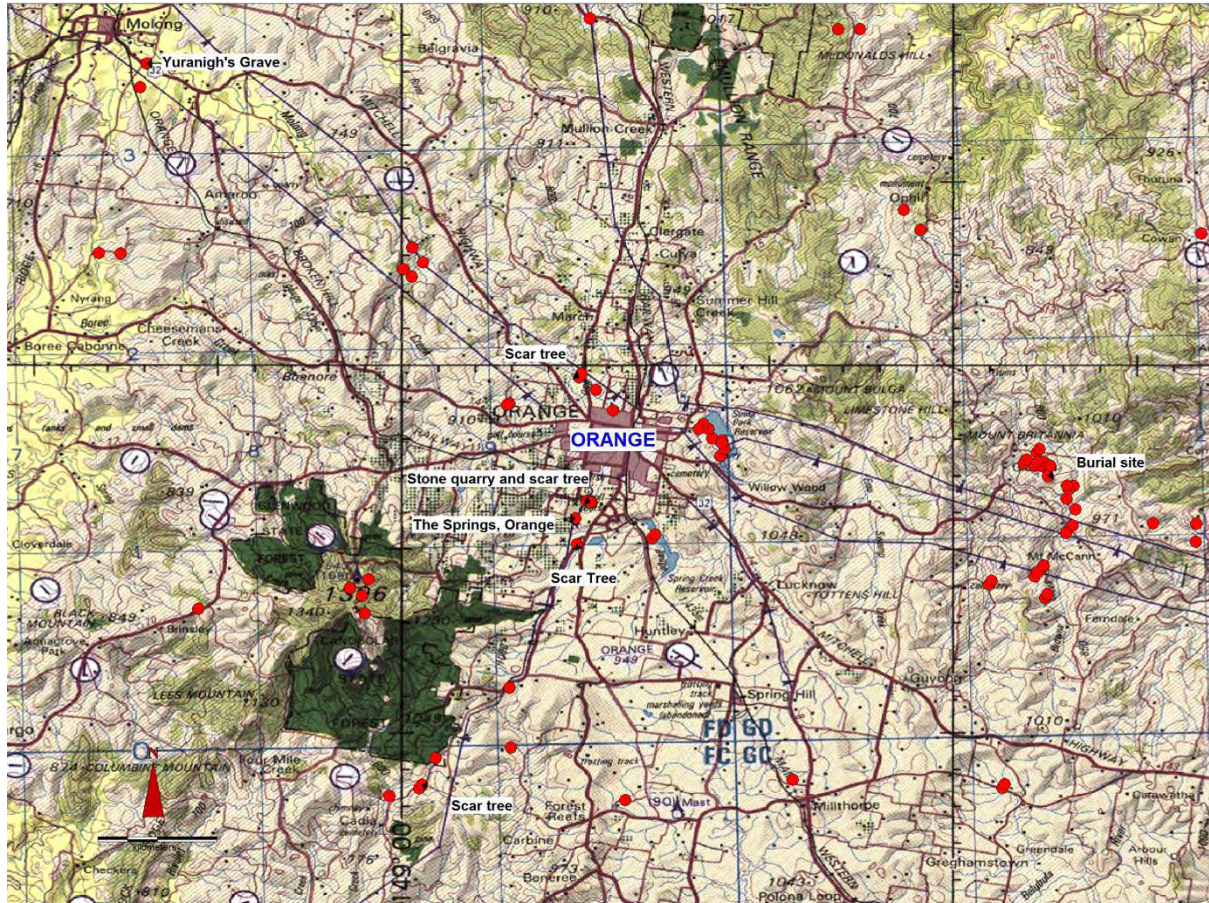


Figure 2: Map showing sites recorded on the AHIMS database

(NTSCORP, Orange City Council, 2012, Orange Aboriginal Heritage Report).

Survey Results

Several native plant species were identified during the site survey including Redgrass (*Bothriochlea macra*), Windmill Grass (*Chloris truncate*), Kidney weed (*Orchandra repens*) Native Geranium (*Geranium Solanderi*) Native Carrot (*Ducas glochidiatus*).

Five scarred trees were identified on the site four from within the site and one on the other side of the fence. The scar on the latter tree is one on a Applebox tree (*Eucalyptus bridgesiana*). The other 4 trees with scars are one large scar on a yellow box (*Eucalyptus Mellidora*) Two toher scors on Blakely's Redgum (*Eucalyptus blakelyi*).

These Aboriginal Cultural site findings suggest Aboriginal people did pass through the area and may have lived around the area of the quarry site.

Ian Sutherland advised the quarry manager of other Aboriginal sites in the local area and recommended that there should be a full site survey completed with an Archaeologist and a team. Ian

noted that he read the initial Aboriginal Cultural Heritage report that was completed in 2002, and found it to be incorrect in its conclusion that there was no evidence of Aboriginal people in the area.

During the survey 5 cultural items were identified, as follows,

Culturally Modified Trees

Plate 1 - Culturally Modified Tree no. 1



Plate 2 - Culturally Modified Tree no. 2



Plate 3 – Culturally Modified Tree no. 3



Plate 4 – Culturally Modified Tree no. 4



Plate 5 – Culturally Modified Tree no. 5



Recommendations.

Based on the cultural survey investigation the following recommendations are made:

Recommendation 1: Aboriginal Cultural Heritage Survey – Full site.

It is recommended that there should be a full site survey undertaken with an Archaeologist and an Aboriginal Cultural site assessment officer. Identification of the sites mentioned within this report indicates the potential for identification of other items such as stone artefacts.

Recommendation 2: Protection of Aboriginal Cultural Heritage – Modified Tree.

It is recommended that a fence, with signage, be erected around the culturally modified tree that is outside the proposed quarry extension area, therefore; giving protection from any damage that could occur from domesticated cattle or human activity. If this is not an appropriate protection mechanism, then discussion with the Orange Local Aboriginal Land Council should be undertaken to resolve what protection methods should be undertaken.

Recommendation 3: Protection of Aboriginal Cultural Heritage – Modified Trees.

It is recommended for the four scarred trees that exist within the proposed quarry site expansion area that after investigation by an archaeologist and an Aboriginal Sites officer, that prior to any activities being undertaken consultation be carried out with the Office of Environment and Heritage and the Orange Local Aboriginal Land Council to ascertain the best course of action for protection of the trees.

Aboriginal Heritage Information System

An AHIMS search did not find any recorded Aboriginal cultural heritage sites within the investigation area, or within a 1000m buffer of the investigation area. (Appendix 1 & 2). However, it is noted that there are sites recorded in a relatively close proximity to the area. There are also sites that have been identified and are currently going through the process of recording. (See Appendix)

References

Country Life Stock and Station Journal (Sydney, NSW : 1924 - 1925) Fri 22 Aug 1924.

Hanson, Aboriginal Cultural Heritage Management Plan, East Guyong Quarry, 2002.

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NTSCORP, Orange City Council, 2012, Orange Aboriginal Heritage Report.

Peak Hill Express 6 September 1907, 'A relic', p. 6.

Pearson, M. 1984 Bathurst Plains and beyond: European colonisation and Aboriginal resistance. Aboriginal History 8: 63-79.

Pardoe, C. and S. Webb 1986 Prehistoric Human Skeletal Remains from Cowra and the Macquarie Marsh, New South Wales. Australian Archaeology 22: 7-26.

Appendix

Copy of AHIMS Searches

Appendix 1: East Guyong Quarry Site AHIMS Search



Office of
Environment
& Heritage

AHIMS Web Services (AWS) Search Result

Purchase Order/Reference : East Guyong 00005

Client Service ID : 501852

Orange Local Aboriginal Land Council

Date: 04 May 2020

14 Palmer St

ORANGE New South Wales 2800

Attention: Lisa Paton

Email: lisa.paton@olalc.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 4, DP:DP854608 with a Buffer of 1000 meters, conducted by Lisa Paton on 04 May 2020.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

<https://www.environment.nsw.gov.au/awssapp/MySearches.aspx>

Appendix 2: Neighbouring East Guyong Sites AHIMS Search



Office of
Environment
& Heritage

AHIMS Web Services (AWS) Search Result

Purchase Order/Reference : East Guyong 00004

Client Service ID : 501772

Orange Local Aboriginal Land Council

Date: 04 May 2020

14 Palmer St
ORANGE New South Wales 2800
Attention: Lisa Paton

Email: lisa.paton@olalc.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot: 1, DP:DP1084108 with a Buffer of 1000 meters, conducted by Lisa Paton on 04 May 2020.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

2	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

<https://www.environment.nsw.gov.au/awssapp/MySearches.aspx>



View of Tree No. 1. Courtesy of Hansen Construction Materials.

SCARRED TREE ASSESSMENT

EAST GUYONG QUARRY, NSW

SEPTEMBER 2020

Report prepared by
OzArk Environment & Heritage
for R.W. Corkery & Co Pty Ltd

on behalf of Hanson Construction Materials Pty Ltd

OzArk

**OzArk
Environment & Heritage**

145 Wingewarra St
(PO Box 2069)
Dubbo NSW 2830

Phone: (02) 6882 0118
Fax: (02) 6882 0630
enquiry@ozarkehm.com.au
www.ozarkehm.com.au

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DOCUMENT CONTROLS

Proponent	Hanson Construction Materials Pty Ltd	
Client	R.W. Corkery & Co Pty Ltd	
Document Description	Scarred Tree Assessment Report: East Guyong Quarry, NSW	
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Prepared For	Prepared By	
Jack Flanagan Environmental Consultant R.W. Corkery & Co Pty Limited	Dr Alyce Cameron Senior Archaeologist OzArk Environment & Heritage 145 Wingewarra Street (PO Box 2069) Dubbo NSW 2830 P: 02 6882 0118 F: 02 6882 6030 alyce@ozarkehm.com.au	
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Enquiries should be addressed to OzArk Environment & Heritage.		

Acknowledgement

OzArk acknowledge Traditional Owners of the area on which this assessment took place and pay respect to their beliefs, cultural heritage and continuing connection with the land. We also acknowledge and pay respect to the post-contact experiences of Aboriginal people with attachment to the area and to the elders, past and present, as the next generation of role models and vessels for memories, traditions, culture and hopes of local Aboriginal people.

EXECUTIVE SUMMARY

OzArk Environment & Heritage (OzArk) has been engaged by R.W. Corkery & Co Pty Ltd (R.W. Corkery; the client), on behalf of Hanson Construction Materials Pty Ltd (the proponent) to complete an assessment of five trees with possible cultural scarring at the East Guyong Quarry, NSW.

Basic AHIMS searches using the Lot and DPs of East Guyong Quarry show that no sites have been registered on the Aboriginal Heritage Information Management System (AHIMS) within the Quarry boundaries (see **Appendix 1**).

Taking into consideration the previous environmental assessments, including heritage (see **Section 1.2**) as well as applying the scarred tree criteria (Long 2005) an accepted standard for identifying culturally modified trees, the following conclusions have been reached for each tree:

- Tree No. 1: not a culturally modified tree
- Tree No. 2: not a culturally modified tree
- Tree No. 3: not a culturally modified tree
- Tree No. 4: unable to determine based on photographs from Orange Local Land Council (OLALC 2020); although it is highly unlikely to be a culturally modified tree
- Tree No. 5: not a culturally modified tree.

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1 INTRODUCTION

1.1 DESCRIPTION OF THE PROPOSAL

OzArk Environment & Heritage (OzArk) has been engaged by R.W. Corkery & Co Pty Ltd (R.W. Corkery; the client), on behalf of Hanson Construction Materials Pty Ltd (the proponent) to complete an assessment of five trees with possible cultural scarring at the East Guyong Quarry, NSW. The proposal is in the Cabonne Local Government Area (LGA) (**Figure 1-1**).

1.2 BACKGROUND

In 2009, an Environment Assessment Report (EAR) was undertaken by Hanson Construction Materials for the hard rock quarry and processing plant at East Guyong, NSW. Part of the EAR included an archaeological assessment of the proposed quarry (Appleton 2002).

Appleton (2002) conducted an archaeological assessment, including field survey with a representative from the Orange Local Aboriginal Land Council (OLALC), of the proposed location for the quarry. There were no Aboriginal sites identified during the assessment. Appleton (2002: 7) described the vegetation in the quarry study area as:

Much of the survey area has been cleared for grazing, but there remained an area of 'grassy woodland'... or open dry sclerophyll woodland along the western scarp of the main ridge, which continued to and beyond the northern boundary. The woodland was dominated by box gums and smooth-barked eucalypts. However, the vast majority of trees comprised of immature regrowth less than 80-100 years old, indicating that the area was probably partially cleared for grazing some time ago...

In 2012, Hanson Construction Materials applied for a modification (Modification 1) regarding a new haul road access for the approved project at East Guyong Quarry (Hanson 2012). Modification 1 was approved 24 December 2012.

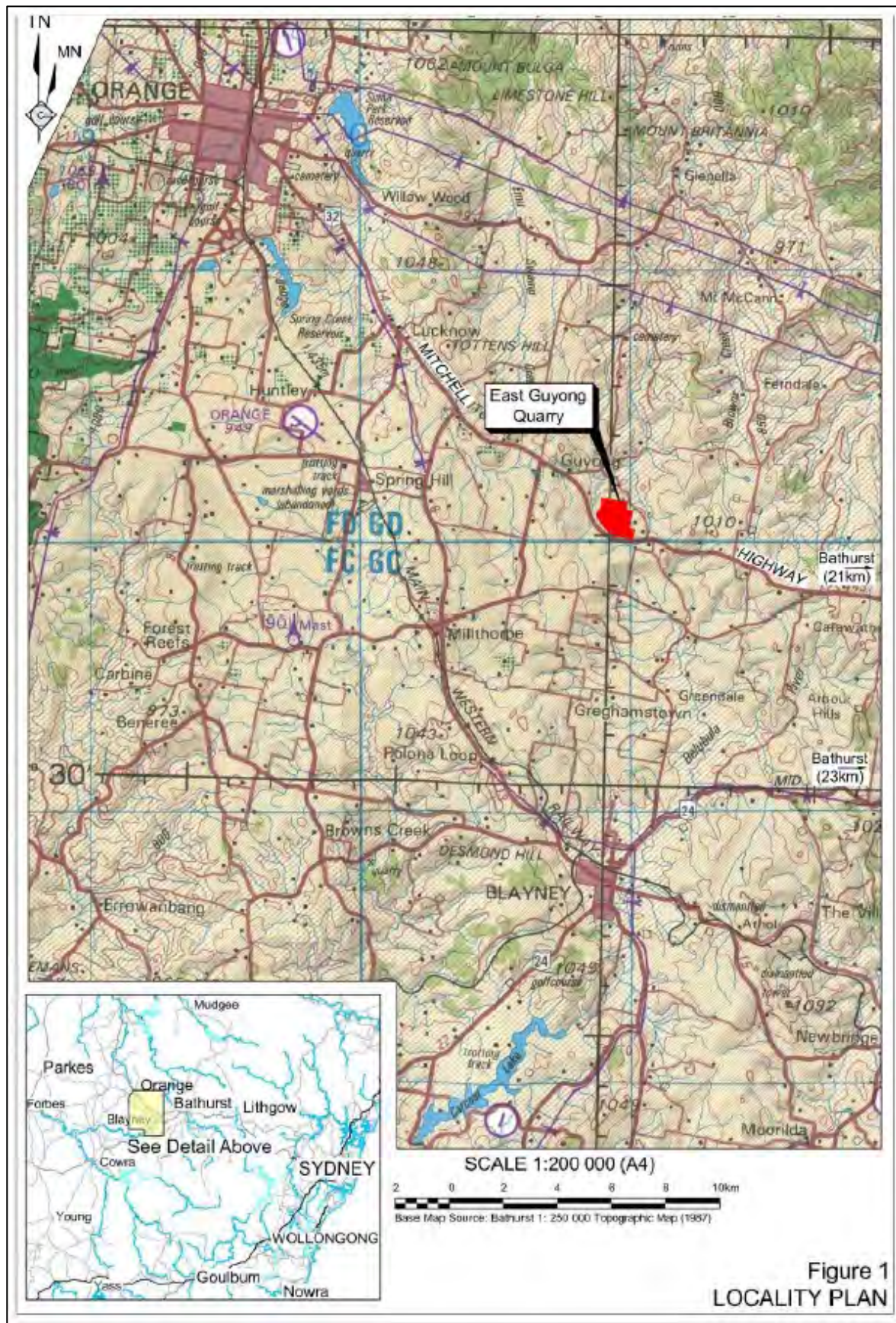
R.W. Corkery prepared the Aboriginal Cultural Heritage Management Plan (ACHMP) for the East Guyong Quarry (R.W. Corkery 2012). The ACHMP was prepared in consultation with the Aboriginal community using the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRs).

In 2018, an application was made for East Guyong Quarry to increase its production by increasing the quarry extraction area (Modification 2). As part of this application, an Environmental Assessment was conducted which identified that the Modification 2 area was covered by the prior assessment by Appleton in 2002 (Umwelt 2018: 28). Modification 2 was approved 17 April 2019.

A survey of the Modification 2 extraction area was undertaken by Ian Sutherland of the OLALC, accompanied by the Quarry Manager, on 8 April 2020 in order to meet a commitment outlined in the existing ACHMP (R.W. Corkery 2012). During the inspection, four possible modified trees

were identified within the approved Modification 2 extraction area and an additional possible modified tree outside of the subject area (OLALC 2020).

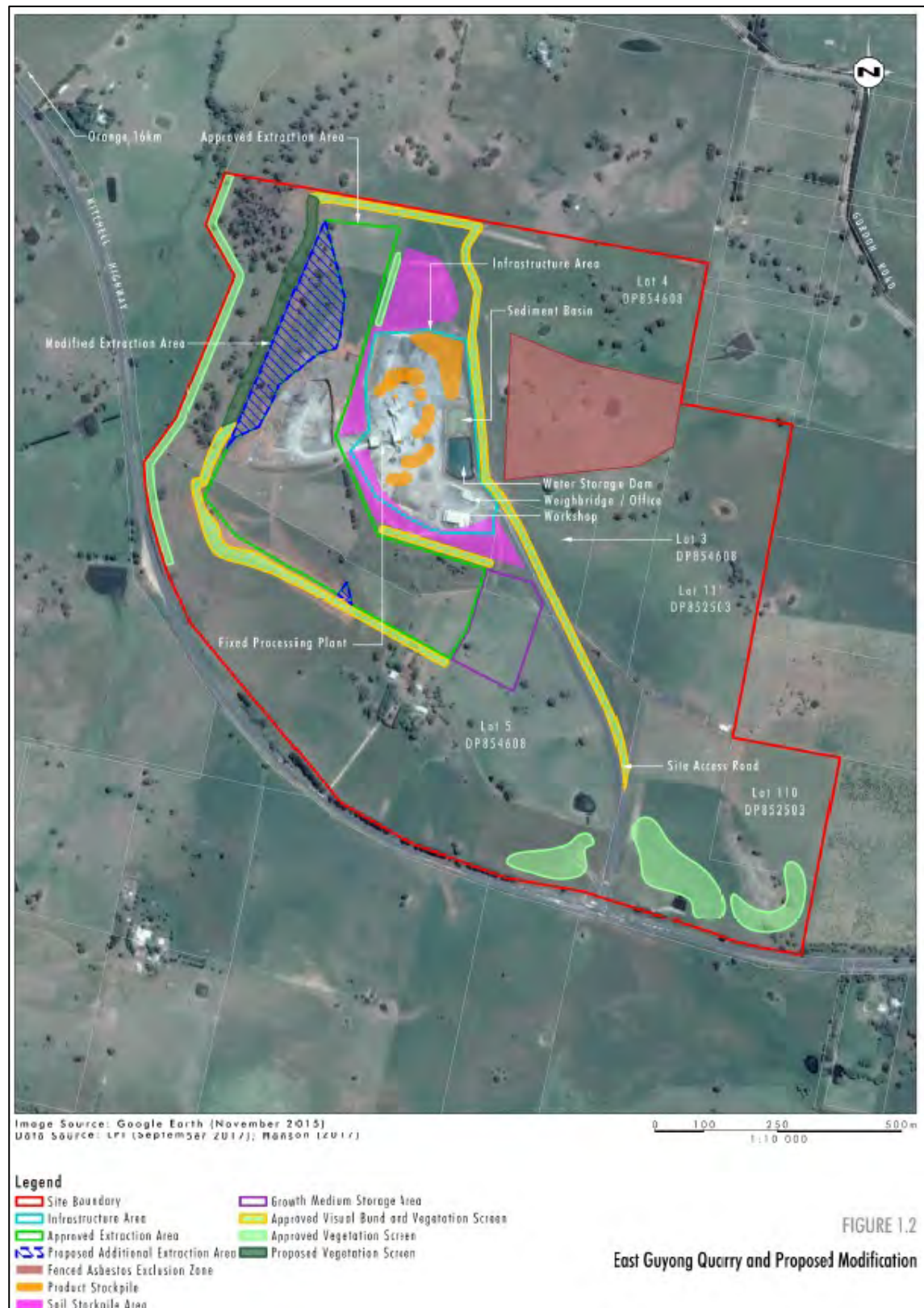
Figure 1-1: Map showing the location of East Guyong Quarry. Source: Hanson 2012: 6.



1.3 STUDY AREA

The study area for the purposes of this report is the Modification 2 area as outlined in Umwelt (2018: 13) and shown in **Figure 1-2**. Modification 2 would include extending the approved extraction area by approximately 3.2 hectares (ha).

Figure 1-2: Location of Modification 2 area of East Guyong Quarry. Source: Umwelt 2018: 3.



1.4 PURPOSE AND OBJECTIVES

The purpose of this report is to assess the possible modified trees identified by OLALC (2020) during a walk-over of the Modification 2 study area.

To help with the assessment, further photographs were taken of the possible modified trees by an Environ Planning & Compliance Coordinate of Hanson Construction Materials. The possibly modified trees identified by OLALC (2020) are assessed against the scarred tree criteria (Long 2005). This criteria is used in order to determine culturally scarred trees from naturally scarred trees or trees with trauma damage. The criteria is the accepted standard for identifying culturally modified trees in NSW.

2 SCARRED TREE ASSESSMENT

2.1 OZARK INVOLVEMENT

2.1.1 Resources

No fieldwork was undertaken for the assessment. Primary resources for this assessment include:

- OLALC 2020: a report detailing the results of the Modification 2 walk over
- Photographs taken of the possible modified trees by an Environ Planning & Compliance Coordinator of Hanson Construction Materials following directions and examples provided by Dr Alyce Cameron, OzArk Senior Archaeologist.

2.1.2 Reporting

The reporting component of the scarred tree assessment was undertaken by:

- Report Author: Dr Alyce Cameron (OzArk Senior Archaeologist, BA [Hons] and PhD [archaeology & palaeoanthropology] Australian National University)
- Reviewer: Ben Churcher (OzArk Principal Archaeologist; BA [Hons], Dip Ed) and Dr Jodie Benton (OzArk Director; BA [Hons] and PhD Archaeology, University of Sydney)

2.2 METHODOLOGY

During a walk over of the Modification 2 disturbance area, five trees were recorded by a representative of the OLALC which were deemed to be possible culturally modified trees. To assess the trees likelihood of being culturally modified trees, criteria based primarily on the Scarred Tree Manual for NSW (Long 2005) is used to assess each. This criteria is outlined in full in **Table 2-1** and examples of trees which match the scarred tree criteria are shown on **Figure 2-1**.

Additional photos to supplement the plates from OLALC (2020) were provided by Hanson Construction Materials. Furthermore, in order to check whether any of the trees have been registered on the Aboriginal Heritage Information Management System (AHIMS) basic searches using the Lot and DPs of the study area were conducted (see **Appendix 1**).

Table 2-1: Diagnostic criteria for determining culturally modified trees.

Criteria	Information
1. The scar must not touch the ground surface.	Scars resulting from fire, fungal attack or lightning nearly always reach the ground surface. Such a termination does not necessarily preclude an Aboriginal origin. Ethno-historic accounts of canoe manufacture occasionally demonstrate scarring to ground level. If the scar does run to the ground, the sides must remain relatively parallel (i.e. not triangular or jagged).
2. The ends of the scar should be squared off or evenly tapered.	Different shapes at the top and bottom (e.g. pointed at top, squared at bottom; round at top, flaring at bottom) are suggestive of natural processes (e.g. branch loss through tearing etc.)
3. The sides of the scar should be parallel or symmetrical.	Few natural scars are likely to have these properties, with the possible exception of fire scars which may be symmetrical but are usually wider at their base. Modern surveyors' marks are typically triangular, and often adzed. These also (regardless of shape) usually have a number carved in the wood, within the scar.
4. The length of the scar must be on the same axis as the tree and not oblique or slanting across the tree or the branch.	Scars which are natural in origin tend to have irregular outlines, sometimes have irregular regrowth and may occur against the axis of the tree.
5. The tree should be reasonably old – i.e. over 100 years	The tree upon which the scar is found should be old enough (i.e. of sufficient age) to have been used by Aboriginal people in (at least) a semi-traditional manner. This means the tree should be at least c.100 years old. The age of the scar should also be reflected in the thickness of the regrowth. Young scars (e.g. some natural scars caused by branches falling or birds or horses gnawing), have characteristically thin regrowth.
6. There must be no obvious natural or other artificial cause	Examples include a branch rip, lightning strike, cockatoo chewed bark or healed bark tears from machinery damage or car impact. Any signs that the scar may not be Aboriginal should be carefully assessed
7. The tree must not be an introduced species	The tree upon which the scar is found should be endemic to the region, i.e. this excludes historic (exotic) plantings.
8. Axe or adze marks	A scar with cut marks on the original wood is likely to be anthropogenic in nature (i.e. as a result of human actions). The location and shape/size may lend support to the scar's origin. For example, stone axe marks would indicate an Aboriginal origin, while steel axe marks post-date the arrival of Europeans. These of course could still have been made by an Aboriginal person in the post-contact era.
9. The presence of epicormic growth	Many scars of Aboriginal origin tend to have an epicormic shoot originating at the base of the scar. This is a new branch shooting from the point of damage and is part of the trees self-preservation mechanism.

Figure 2-1: Examples of culturally scarred trees.

Examples of culturally scarred trees: Symmetrical shape, rounded proximal and distal ends (except where overgrowth creates the 'impression' of pointed terminations), no signs of tearing, weathered dry wood, substantial overgrowth, likely location (i.e. adjacent to waterways where people would have camped in the past).

2.3 SCARRED TREE ASSESSMENT

2.3.1 Tree No. 1

The results of the criteria analysis outlined in **Table 2-2** indicate that Tree No. 1 is not a culturally modified tree. The shape of the scar, signs of insect infestation, and the presence of a broken branch at the top of the scar all suggest that the scar is likely caused by either impact or trauma. **Figure 2-2** shows recent photographs of Tree No. 1 and the scar.

Table 2-2: Tree No. 1. Scarred Tree Criteria.

Criteria	Information
1. The scar must not touch the ground surface.	The scar does not touch the ground, though is close (approximately 30 centimetres (cm) from the ground surface).
2. The ends of the scar should be squared off or evenly tapered.	The top end is obscured by a broken branch. The bottom of the scar is not even.
3. The sides of the scar should be parallel or symmetrical.	The sides of the scar are not parallel or symmetrical.
4. The length of the scar must be on the same axis as the tree and not oblique or slanting across the tree or the branch.	The scar is on the same axis as the tree.
5. The tree should be reasonably old – i.e. over 100 years.	Trunk circumference appears to be approximately one metre (m), while the height of the tree is around 10–15 m.
6. There must be no obvious natural or other artificial cause	The small broken branch / offshoot at the top of scar is indicative that this scar was caused by impact or trauma damage. Also, the general context of the tree and the visible branches on the ground behind it also suggest the scar is possibly due to impact or trauma. There are also signs that the tree is affected by insect activity. This usually shows on the scar surface as borer holes and galleries (shallow 'tracks' running across the dry face). Scars due to insect activity are often triangular or irregular in shape and usually occur near the base of the tree, and in some cases, extend down to ground level.
7. The tree must not be an introduced species	The tree is a native species.
8. Axe or adze marks	There are no axe or adze marks present.
9. The presence of epicormic growth	There is no epicormic growth at the bottom the scar. There is broken branch at the top of the scar.
Conclusion	Not a culturally modified tree.

Figure 2-2: Tree no 1.

	
1. Tree No 1 (source OLALC 2020: 6).	2. Scar detail of Tree No. 1 (source Hanson Construction Materials).
	
3. Top of scar detail of Tree No. 1 (source Hanson Construction Materials).	4. View of Tree No. 1 (source Hanson Construction Materials).

2.3.2 Tree No. 2

The results of the criteria analysis outlined in **Table 2-3** indicate that Tree No. 2 is not a culturally modified tree. The shape of the scar, signs of insect infestation, and the presence of a hollow higher along the trunk, the trunk split between the hollow and the scar and the ground surface, all indicative of branch tear. **Figure 2-3** shows recent photographs of Tree No. 2 and the scar.

Table 2-3: Tree No. 2. Scarred Tree Criteria.

Criteria	Information
1. The scar must not touch the ground surface.	The scar does not touch the ground surface.
2. The ends of the scar should be squared off or evenly tapered.	The top end of the scar is ripped. The bottom end of the scar is curved, though there is a split which extends from the base of the scar down the trunk to the ground surface.
3. The sides of the scar should be parallel or symmetrical.	The sides of the scar are not parallel or symmetrical. The regrowth around the scar is not even, suggesting that the bark came away gradually over time instead of in a single removal event.
4. The length of the scar must be on the same axis as the tree and not oblique or slanting across the tree or the branch.	The scar is not on the same axis as the tree. It is twisting slightly around the trunk.
5. The tree should be reasonably old – i.e. over 100 years.	The tree is young and appears to be regrowth. The circumference of the tree is small, approximately 50–60 cm.
6. There must be no obvious natural or other artificial cause	Based on the splitting of the trunk and tearing at the top of the scar, this scar is likely due to branch tear. There is a hollow from a previous branch higher up on the trunk than the scar and a split in the trunk between the two. The scar, and associated split in trunk, is likely due to when the upper branch came off the tree There is also signs of insect activity on the scar surface as evidenced by the borer holes and galleries.
7. The tree must not be an introduced species	The tree is native.
8. Axe or adze marks	There are no axe or adze marks on the scar surface.
9. The presence of epicormic growth	There are no signs of epicormic growth at the base of the scar
Conclusion	Not a culturally modified tree.

Figure 2-3: Tree no 2.

	
1. Tree No 2 (source Orange LALC 2020: 7).	2. Scar of Tree No. 2 (source Hanson Construction Materials).
	
3. Centre of scar of Tree No. 2 (source Hanson Construction Materials).	4. View of Tree No. 2 (source Hanson Construction Materials).

2.3.3 Tree No. 3

The results of the criteria analysis outlined in **Table 2-4** indicate that Tree No. 3 is not a culturally modified tree. Based on the size, shape and regrowth surrounding the hollow, it was likely caused by trauma, possibly branch tear. **Figure 2-4** shows recent photographs of Tree No. 3 and the scar.

Table 2-4: Tree No. 3. Scarred Tree Criteria.

Criteria	Information
1. The scar must not touch the ground surface.	The scar does not touch the ground surface.
2. The ends of the scar should be squared off or evenly tapered.	The scar is widely curved at the top and a point at the bottom. The scar is a small 'upside down teardrop' shape. The face of the scar has deteriorated.
3. The sides of the scar should be parallel or symmetrical.	The sides of the scar are roughly symmetrical.
4. The length of the scar must be on the same axis as the tree and not oblique or slanting across the tree or the branch.	The scar does follow the same axis as the tree.
5. The tree should be reasonably old – i.e. over 100 years.	The tree appears to be young.
6. There must be no obvious natural or other artificial cause	The scar appears to be natural. From the shape of the regrowth and the scar itself, the remaining hollow is likely due to impact or trauma. The site of the scar is likely where a branch was present previously.
7. The tree must not be an introduced species	The tree is native.
8. Axe or adze marks	There are no axe or adze marks present.
9. The presence of epicormic growth	There is no epicormic growth present.
Conclusion	Not a culturally modified tree.

Figure 2-4: Tree No 3.

	
1. Tree No 3 (source OLALC 2020: 8).	2. Detail of scar on Tree No. 3 (source Hanson Construction Materials).
	
3. Detail of scar on Tree No. 3 (source Hanson Construction Materials).	4. View of Tree No. 3 (source Hanson Construction Materials).

2.3.4 Tree No. 4

The only available photograph for Tree No. 4 is provided in **Figure 2-5**. Unfortunately, the tree was unable to be reidentified for further photographs to be taken. Based on **Figure 2-5**, the scar in question appears to be on a dead branch lying on the ground as there is grass in the background. The trunk in the photograph has been affected by insects as galleries and borer holes are present and it is highly deteriorated. Due to the lack of further photographs, a conclusive analysis using the criteria is unable to be conducted for this tree; although it is highly unlikely that it is culturally modified.

Figure 2-5: Tree No 4.



1. Tree No 4 (source OLALC 2020: 9).

2.3.5 Tree No. 5

Of the five trees identified as having possible cultural scars, Tree No. 5 is visually suggestive of being cultural in origin. However, the results of the criteria analysis outlined in **Table 2-5** indicate that Tree No. 5 is not a culturally modified tree. Based on the shape and regrowth surrounding the scar, it was likely caused branch tear. **Figure 2-6** shows recent photographs of Tree No. 5 and the scar.

Table 2-5: Tree No. 5. Scarred Tree Criteria.

Criteria	Information
1. The scar must not touch the ground surface.	The scar does not touch the ground surface. The base of the scar is approximately 30 cm from the ground surface.
2. The ends of the scar should be squared off or evenly tapered.	The bottom of the scar is tapered, though not evenly. The top of scar is difficult to see due to a piece of bark obscuring it but appears to be uneven.
3. The sides of the scar should be parallel or symmetrical.	The sides of the scar are mostly parallel.
4. The length of the scar must be on the same axis as the tree and not oblique or slanting across the tree or the branch.	The length of the scar follows the same axis as the tree trunk.
5. The tree should be reasonably old – i.e. over 100 years.	The tree appears to be of a similar age to those around it. The trees do not appear to be of an older age, though it is difficult to tell.
6. There must be no obvious natural or other artificial cause	There is ripping in the bark at the top of the scar, indicating the scar has likely been caused by branch tear. The regrowth of bark around the top of the scar and the presence of the overlaying bark supports this conclusion.
7. The tree must not be an introduced species	The tree is a native species.
8. Axe or adze marks	Based on the photos there does not appear to be any axe or adze marks.
9. The presence of epicormic growth	There is no presence of epicormic growth.
Conclusion	Unlikely to be a culturally scarred tree.

Figure 2-6: Tree No 5.

	
1. Tree No 5 (source OLALC 2020: 10).	2. Scar of Tree No. 5 (source Hanson Construction Materials).
	
3. View of Tree No. 5 (source Hanson Construction Materials).	4. Detail top of scar of Tree No. 5 (source Hanson Construction Materials).

	This cell is blank
5. Detail of base of scar on Tree No. 5. Note the uneven taper at the base of the scar (source Hanson Construction Materials).	

3 CONCLUSIONS

Basic AHIMS searches using the Lot and DPs of East Guyong Quarry show that no sites have been registered on AHIMS within the Quarry boundaries (see **Appendix 1**).

Taking into consideration the previous environmental assessments, including heritage (see **Section 1.2**) as well as applying the scarred tree criteria (Long 2005) an accepted standard for identifying culturally modified trees, the following conclusions have been reached for each tree:

- Tree No. 1: not a culturally modified tree
- Tree No. 2: not a culturally modified tree
- Tree No. 3: not a culturally modified tree
- Tree No. 4: unable to determine based on photographs from OLALC 2020; although it is highly unlikely to be a culturally modified tree
- Tree No. 5: not a culturally modified tree.

REFERENCES

- | | |
|-------------|--|
| Long 2005 | Long A. 2005. <i>Aboriginal scarred trees in New South Wales: A Field Manual</i> . Department of Environment and Conservation (NSW). |
| Hanson 2012 | Hanson Heidelberg Cement Group. 2012. <i>Section 75W Planning Assessment Report: East Guyong Quarry</i> . |
| OLALC 2020 | Orange Local Aboriginal Land Council. 2020. <i>Aboriginal Cultural Heritage Investigation: East Guyong Quarry – Expanded Pit Area</i> . Report to Hanson Construction Materials Pty Ltd. |
| Umwelt 2018 | Umwelt. 2018. <i>East Guyong Quarry Modification 2: Environmental Assessment</i> . Report for Hanson Heidelberg Cement Group. |

APPENDIX 1 BASIC AHIMS SEARCHES BY LOT AND DP



Office of
Environment
& Heritage

AHIMS Web Services (AWS) Search Result

Purchase Order/Reference : East Guyong

Client Service ID : 528947

OzArk Environmental and Heritage Management

Date: 20 August 2020

PO Box 2069

Dubbo New South Wales 2830

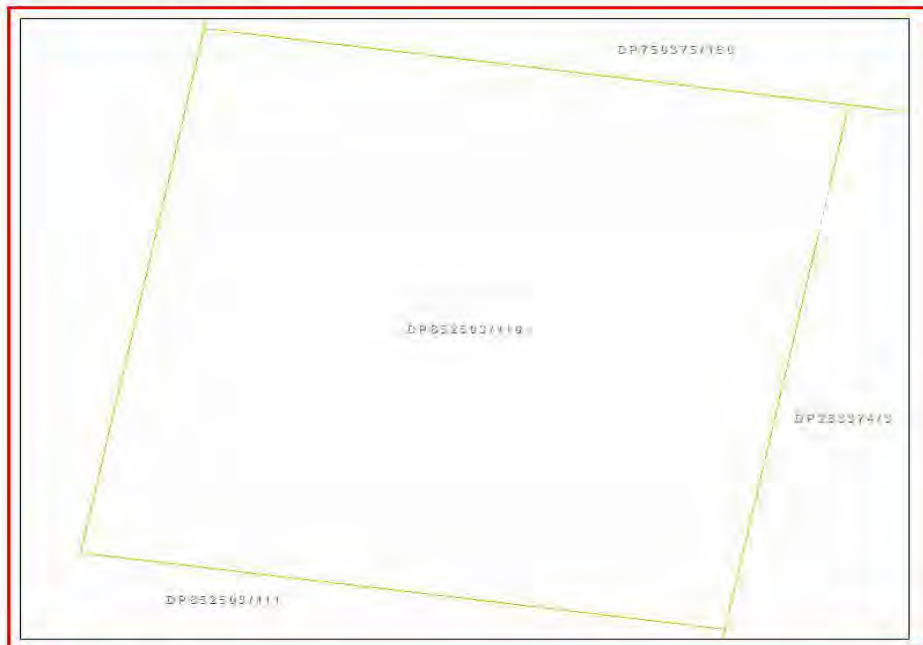
Attention: Alyce Cameron

Email: alyce@ozarkehm.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 110, DP:DP852503 with a Buffer of 0 meters, conducted by Alyce Cameron on 20 August 2020.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location.*



Office of
Environment
& Heritage

AHIMS Web Services (AWS) Search Result

Purchase Order/Reference : East Guyong

Client Service ID : 528948

OzArk Environmental and Heritage Management

Date: 20 August 2020

PO Box 2069

Dubbo New South Wales 2830

Attention: Alyce Cameron

Email: alyce@ozarkehm.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 111, DP:DP852503 with a Buffer of 0 meters, conducted by Alyce Cameron on 20 August 2020.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location.*



Office of
Environment
& Heritage

AHIMS Web Services (AWS) Search Result

Purchase Order/Reference : East Guyong

Client Service ID : 528949

OzArk Environmental and Heritage Management

Date: 20 August 2020

PO Box 2069

Dubbo New South Wales 2830

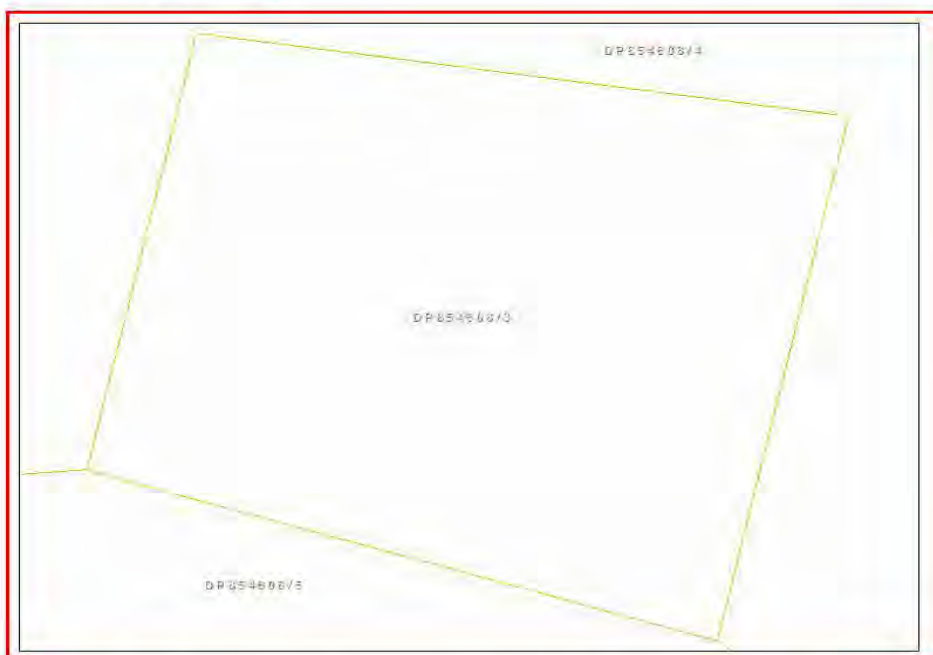
Attention: Alyce Cameron

Email: alyce@ozarkehm.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 3, DP:DP954608 with a Buffer of 0 meters, conducted by Alyce Cameron on 20 August 2020.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location.*



Office of
Environment
& Heritage

AHIMS Web Services (AWS) Search Result

Purchase Order/Reference : East Guyong

Client Service ID : 528951

OzArk Environmental and Heritage Management

Date: 20 August 2020

PO Box 2069

Dubbo New South Wales 2830

Attention: Alyce Cameron

Email: alyce@ozarkehm.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 4, DP:DP854608 with a Buffer of 0 meters, conducted by Alyce Cameron on 20 August 2020.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location.*



Office of
Environment
& Heritage

AHIMS Web Services (AWS) Search Result

Purchase Order/Reference : East Guyong

Client Service ID : 528952

OzArk Environmental and Heritage Management

Date: 20 August 2020

PO Box 2069

Dubbo New South Wales 2830

Attention: Alyce Cameron

Email: alyce@ozarkehm.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 5, DP:DP854608 with a Buffer of 0 meters, conducted by Alyce Cameron on 20 August 2020.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location.*

APPENDIX 8

Rehabilitation Reports

Inspection Proforma

Client: Hanson Quarry – East Guyong



Conducted By	Josephine Dessmann & Emily Cotterill	Weather conditions	Warm, clear and sunny
Date/s Conducted	20 th February 2020	Location	East Guyong Hanson Quarry

Summary and recommendations:

The Environmental Factor (TEF) were engaged to complete quarterly weed inspections at the Hanson Quarry East Guyong. The following documents the results of the newly established weed cover monitoring transects, and outcomes of visual observations taken across the entire quarry site.

The weed survey was conducted as follows:

- Five (5) x 50 m transects were established across the site, with 1 m x 1 m ground cover/litter plots recorded at intervals of 10 m (at 5 m, 15 m, 25 m, 35 m and 45 m respectively) along each transect
- All accessible areas were traversed by vehicle, or on foot where safe to do so, by two (2) qualified ecologists
- Weeds observed were marked with a handheld GPS device, and collated into a single kmz file to enable ease of viewing for future reference, and
- Results were then collated herein, including photographic records of the five (5) transects established (refer Transect 1, Transect 2, Transect 3, Transect 4, and Transect 5), and all litter plots completed (Appendix 1).

Several Priority weeds noted within the Central Tablelands Regional Strategic Weed Management Plan (2017-2022) have been recorded within the Hanson Quarry site. Recommendations for management have been included where appropriate in the following tables.

Weed	Weed listing and General Biosecurity Duty (GBD)	Location	Management recommendation	Photo
Scotch Thistle (<i>Onopordon acanthium</i>)	Community Concern list - Regional	Scotch thistles have established within the pit area on exposed bare earth and rocks. This is the most extensive Priority weed within the Quarry site.	Most of the thistle present has finished flowering and the seed has already been set. Late season rains are likely to encourage renewed growth. A combination of herbicide leaf spray on new rosettes and chipping of mature plants concentrating along the boundaries of the sales pit is recommended.	

Inspection Proforma

Client: Hanson Quarry – East Guyong

Weed	Weed listing and General Biosecurity Duty (GBD)	Location	Management recommendation	Photo
Bathurst Burr (<i>Xanthium spinosum</i>)	Community Concern list - Regional	Bathurst Burr is present within the pit area scattered along exposed soils	A combination of herbicide leaf spray on new rosettes and chipping of mature plants concentrating along the boundaries of the sales pit is recommended.	
Willow (<i>Salix</i> sp)	Weed of National Significance State Priority Weed Asset Protection – Sate Community Concern list - Regional	An individual sapling is present between the ponds.	Pulling out this sapling while small or cutting and painting the open stem with herbicide is the recommended control.	
Sweet Briar (<i>Rosa rubiginosa</i>)	Community Concern list - Regional	Individual located within north western rehabilitation area – open woodland.	Chipping of this individual and searches for any new growth following the late summer rain should be undertaken.	

Inspection Proforma

Client: Hanson Quarry – East Guyong

Weed	Weed listing and General Biosecurity Duty (GBD)	Location	Management recommendation	Photo
St Johns Wort (<i>Hypericum perforatum</i>)	Priority Weed Asset Protection – Regional; Protect grazing land free of St John's wort	4 m x 4 m area located along outer slope embankment of pit area adjacent rehabilitation area – open woodland.	Prompt herbicide spraying of this discrete patch is recommended. Late season rains have resulted in the late flowering of this priority weed – herbicide spraying at this time should be effective.	
Blackberry (<i>Rubus fruticosus agg</i>)	State and Regional Priority Weed Asset Protection – Regional; Protect primary production land, conservation and natural environments free of Blackberry	Blackberry stems scattered throughout rocky slopes near rehabilitation area – open woodland	Defoliated Blackberry stalks are mostly present. Summer fruits have finished. Late season rains are likely to encourage renewed growth. Spot spraying with herbicide is recommended during periods of new growth.	
Blue Heliotrope (<i>Heliotropium amplexicaule</i>)	Regional Community Concern	Adjacent to Hanson Quarry entrance from Mitchell Highway	Spot spraying with herbicide during new growth periods	

Inspection Proforma

Client: Hanson Quarry – East Guyong



Monitoring transect results

Transect	Location description		Point					Cover %	Species present within and surrounding transect:
			1	2	3	4	5		
1	Regenerating woodland along rocky slope north west of site.	Priority Weeds	0	0	0	0	0	0	Blackberry, Sweet Briar, Bathurst Burr
	Following recent rain broad leaf weeds are colonising	Other Weeds	70	2	19	1	50	28.4	Hawthorn (<i>Crataegus monogyna</i>), Paddy Melon (<i>Cucumis myriocarpus</i>), Purslane (<i>Portulaca oleracea</i>), Catsear (<i>Hypochaeris radicata</i>), <i>Philaris aquatica</i> , Yarrow (<i>Achillea millefolium</i>), Amaranth (<i>Amaranthus</i> sp), Sorrel (<i>Acetosella vulgaris</i>), Clover (<i>Trifolium</i> sp), Mallow weed (<i>Malva</i> sp), Horehound (<i>Marrubium vulgare</i>)
	Tree die back and presence of mistletoe	Native	1	0	1	4	10	3.2	Native Geranium (<i>Geranium homeanum</i>), Lomandra sp, Slender Dock Weed (<i>Rumex</i> sp), Climbing Salt bush (<i>Einadia nutans</i>)
	Evidence of grazing by rabbits and hares.	Bare earth / rock	29	98	80	95	40	68.4	



Transect 1 Photo point

Inspection Proforma

Client: Hanson Quarry – East Guyong



Transect	Location		Point					Cover %	Species present within and surrounding transect:
			1	2	3	4	5		
2	Grazed Paddock	Priority Weeds	0	0	0	0	0	0	No priority weeds observed
		Other Weeds	50	30	50	50	70	50	Thorn Apple (<i>Datura stramonium</i>), Philaris aquatica, Amaranth, Paddy Melon (<i>Cucumis myriocarpus</i>)
		Native	1	0	0	0	0	0.2	Climbing Salt bush (<i>Einadia nutans</i>)
	Evidence of heavily grazing during drought conditions; rabbits, horses and possibly sheep	Bare earth / rock	49	70	50	50	30	49.8	



Transect 2 Photo Point

Inspection Proforma

Client: Hanson Quarry – East Guyong



Transect	Location description		Point					Cover %	Species present within and surrounding transect:
			1	2	3	4	5		
3	Grazed Paddock small patch of open woodland canopy eastern extent of site	Priority Weeds	0	0	0	0	0	0	No priority weeds observed
	Erosion along rocky slope	Other Weeds	10	85	50	20	20	37	Amaranth, Purslane, Variegated Milk Thistle (<i>Silybum marianum</i>), Phalaris aquatica, Amaranth, Paddy Melon (<i>Cucumis myriocarpus</i>)
	Eucalypts showing signs of stress and dieback	Native	0	1	1	0	0	0.4	Climbing Salt bush (<i>Einadia nutans</i>), Yellow Box (<i>Eucalyptus melliodora</i>), Bundy (<i>Eucalyptus goniocalyx</i>), Dock (<i>Rumex</i> sp)
		Bare earth / rock	90	14	49	80	80	62.6	



Transect 3 Photo Point

Inspection Proforma

Client: Hanson Quarry – East Guyong



Transect	Location description		Point					Cover %	Species present within and surrounding transect:
			1	2	3	4	5		
4	Grazed Paddock – north eastern extent	Priority Weeds	0	0	0	0	0	0	No priority weeds observed
	Erosion along slope	Other Weeds	15	20	10	10	5	12	Amaranth, Stinging Nettle (<i>Urtica dioica</i>), Mallow weed (<i>Malva</i> sp), Hawthorn (<i>Crataegus monogyna</i>)
	Eucalypts showing signs of stress and dieback	Native	0	0	0	0	0	0	
	Heavily grazed including rabbits, Kangaroos	Bare earth / rock	85	80	90	90	95	88	



Transect 4 Photo Point

Inspection Proforma

Client: Hanson Quarry – East Guyong



Transect	Location description		Point					Cover %	Species present within and surrounding transect:
			1	2	3	4	5		
5	Revegetated earthen bund / embankment adjacent spillway	Priority Weeds	0	0	0	0	0	0	Blue Heliotrope observed outside the transect
		Other Weeds	15	70	25	80	70	52%	Pigweed (<i>Chenopodium album</i>), Variegated Thistle, Purslane, Amaranth, Horehound, Phalaris aquatica, , Patterson's Curse, Flatweed,
		Native	0	0	0	0	0	0	
		Bare earth / rock	85	30	75	20	30	48%	



Transect 5 Photo Point

Inspection Proforma

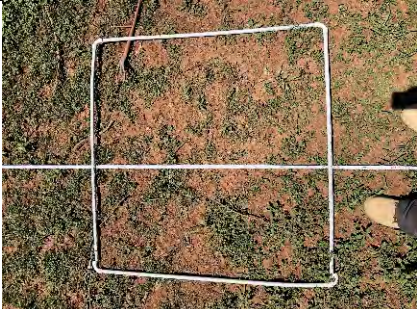
Client: Hanson Quarry – East Guyong

Mud map / sketch of site

Location of priority weeds recorded, notable weed extents, significant features etc

Provided as kml. file.

Appendix 1 – 1 m x 1 m cover plot photos from site inspection

Transect	Point 1	Point 2	Point 3	Point 4	Point 5
1					
2					
3					
4					
5					

Inspection Proforma

Client: Hanson Quarry – East Guyong



Conducted By	Josephine Dessmann & Emily Cotterill	Weather conditions	Warm, clear and sunny
Date/s Conducted	19 th May 2020	Location	East Guyong Hanson Quarry

Summary and recommendations:

The Environmental Factor (TEF) were engaged to complete quarterly weed inspections at the Hanson Quarry East Guyong site. The following report documents the results of the second quarter weed cover monitoring transects, and outcomes of visual observations taken across the entire quarry site.

The weed survey was conducted as follows:

- The five (5) x 50 m transects established across the site were revisited to document changes to the structure and composition of groundcovers in these areas., with 1 m x 1 m ground cover/litter plots recorded at intervals of 10 m (at 5 m, 15 m, 25 m, 35 m and 45 m respectively) along each established transect
- All accessible areas were traversed by vehicle, or on foot where safe to do so, by two (2) qualified ecologists
- Weeds observed were marked with a handheld GPS device, and collated into a single kmz file to enable ease of viewing for future reference, and
- Results were then collated herein, including photographic records of the five (5) transects established (refer Transect 1, Transect 2, Transect 3, Transect 4, and Transect 5), and all litter plots completed (Appendix 1).

Several Priority weeds noted within the Central Tablelands Regional Strategic Weed Management Plan (2017-2022), in accordance with the *Local Land Services Act 2013* (LLS Act) have been recorded within the Hanson Quarry site. Other notable weeds have also been identified. Recommendations for management have been included where appropriate in the following tables. All weeds recorded during the first survey were observed on site; some had set seed and foliage had died-back as part of seasonal transition.

Notably, several of the broad-leafed weeds observed during the second quarter weed survey are actively growing (as at 19 May 2020), and would be susceptible to control via foliar spray if Hanson were in a position to execute this prior to winter (late May, early June 2020).

Inspection Proforma

Client: Hanson Quarry – East Guyong

Weed	Weed listing and General Biosecurity Duty (GBD) under LLS Act	Location	Management recommendation	Photo
Echium/Paterson's Curse (<i>Echium plantaginium</i>)	Not listed however at the current levels; It reduces pasture productivity and is toxic to livestock. It can degrade the natural environment, compromising habitat values by crowding out and suppressing native vegetation.	The current dominant weed occurring across grazing paddocks, scattered within the rehabilitation area, along Sales Pit boundaries and blanketing the bunds.	This species grows and fruits in response to winter rainfall. This extensive weed has not gone to flower and set seed. Prompt herbicide spray completed to ensure seed is not set this season is <u>strongly recommended</u>.	
Black Nightshade (<i>Solanum nigrum</i>)	Not listed, however can be toxic to grazing stock	Scattered throughout the quarry along the revegetated bunds and Sales Pit boundary, and scattered throughout grazing paddocks	This species grows and fruits in response to autumn/winter rainfall. If broadscale herbicide foliage spraying is progressed this species can be targeted too.	

Inspection Proforma

Client: Hanson Quarry – East Guyong



Weed	Weed listing and General Biosecurity Duty (GBD) under LLS Act	Location	Management recommendation	Photo
Scotch Thistle (<i>Onopordon acanthium</i>)	Community Concern list - Regional	Scotch Thistles have established within the pit area on exposed bare earth and rocks. Also present within grazed paddocks.	Late season rains are likely to encourage renewed growth. A combination of herbicide leaf spray on new rosettes and chipping of mature plants concerntrating along the boundaries of the Sales Pit is recommended.	
Bathurst Burr (<i>Xanthium spinosum</i>)	Community Concern list - Regional	Bathurst Burr is present within the pit area scattered along exposed soils Bathurst Burr has set seed and foliage has now died back.	It is no longer suitable to use herbicide leaf spray to target this priorty weed. Recommended to remove seed where evident with concentrated management during Spring growth period.	

Inspection Proforma

Client: Hanson Quarry – East Guyong



Weed	Weed listing and General Biosecurity Duty (GBD) under LLS Act	Location	Management recommendation	Photo
Willow (<i>Salix</i> sp)	Weed of National Significance State Priority Weed Asset Protection – Sate Community Concern list - Regional	An individual sapling is present between the ponds.	Pulling out this sapling while small or cutting and painting the open stem with herbicide is the recommended control.	
Sweet Briar (<i>Rosa rubiginosa</i>)	Community Concern list - Regional	Individual located within north western rehabilitation area – open woodland.	Chipping of this individual and searches for any new growth following the late summer rain should be undertaken.	

Inspection Proforma

Client: Hanson Quarry – East Guyong

Weed	Weed listing and General Biosecurity Duty (GBD) under LLS Act	Location	Management recommendation	Photo
St John's Wort (<i>Hypericum perforatum</i>)	Priority Weed Asset Protection – Regional; Protect grazing land free of St John's wort	Area located along outer slope embankment of pit area adjacent and within rehabilitation area – open woodland.	Prompt herbicide spraying of these discrete patches is recommended. Late season rains have resulted in the late flowering of this priority weed – herbicide spraying at this time should be effective.	
Blackberry (<i>Rubus fruticosus</i> spp. agg.)	State and Regional Priority Weed Asset Protection – Regional; Protect primary production land, conservation and natural environments free of Blackberry	Blackberry stems scattered throughout rocky slopes near rehabilitation area – open woodland	Defoliated Blackberry stalks are mostly present. Summer fruits have finished. Late season rains have resulted in new growth. Spot spraying with herbicide is recommended during periods of new growth.	
Blue Heliotrope (<i>Heliotropium amplexicaule</i>)	Regional Community Concern	Adjacent to Hanson Quarry entrance from Mitchell Highway	Spot spraying with herbicide during new growth periods.	

Inspection Proforma

Client: Hanson Quarry – East Guyong



Monitoring transect results

Transect	Location description		Point					Cover %	Species present within and surrounding transect:
			1	2	3	4	5		
1	Regenerating woodland along rocky slope north west of site.	Priority Weeds	0	0	0	1	0	0.2	Blackberry (<i>Rubus</i> sp)
	Following recent rain broad leaf weeds are colonising	Other Weeds	20	15	80	44	25	36.8	Clover, (<i>Trifolium</i> sp), Echium sp, Common Stork's bill (<i>Erodium cicutarium</i>), Wild Oats (<i>Avena barbata</i>), Malva sp, Medic sp Black Nightshade (<i>Solanum nigrum</i>), Hawthorn (<i>Crataegus monogyna</i>), Paddy Melon (<i>Cucumis myriocarpus</i>), Catsear (<i>Hypochaeris radicata</i>), <i>Phalaris aquatica</i> , Amaranth (<i>Amaranthus</i> sp, Mallow weed (<i>Malva</i> sp), Horehound (<i>Marrubium vulgare</i>), Fat Hen (<i>Chenopodium album</i>)
	Tree die back and presence of mistletoe	Native	0	0	1	0	1	0.4	Purslane (<i>Portulaca oleracea</i>), Rytidisperma sp, Rumex brownie, <i>Geranium homeanum</i>
	Evidence of grazing by rabbits and eastern grey kangaroos– scats, diggings and burrows	Bare earth / rock	80	85	20	55	75	63	

Transect 1 Photo Monitoring Point



Q1



Q2

Inspection Proforma

Client: Hanson Quarry – East Guyong

Transect	Location		Point					Cover %	Species present within and surrounding transect:
			1	2	3	4	5		
2	Grazed Paddock Evidence of grazing rabbits, kangaroos and sheep – scats and diggings	Priority Weeds	0	0	0	0	0	0	No priority weeds observed
		Other Weeds	75	70	80	80	84	77.8	Thorn Apple (<i>Datura stramonium</i>) (now died back), <i>Phalaris aquatica</i> , Amaranth, Paddy Melon (<i>Cucumis myriocarpus</i>), Clover (<i>Trifolium sp</i>), Wild Oats (<i>Avena barbata</i>), Eleusine sp, Medicago sp,
		Native	0	0	0	0	1	0.2	Climbing Salt bush (<i>Einadia nutans</i>), Purslane
		Bare earth / rock	25	30	20	20	15	22	

Transect 2 Photo Monitoring Point



Q1



Q2

Inspection Proforma

Client: Hanson Quarry – East Guyong



Transect	Location description		Point					Cover %	Species present within and surrounding transect:
			1	2	3	4	5		
3	Grazed Paddock small patch of open woodland canopy eastern extent of site	Priority Weeds	0	0	0	0	0	0	No priority weeds observed
		Other Weeds	24	84	78	79	74	67.8	Echium sp, Amaranth, Variegated Milk Thistle (<i>Silybum marianum</i>), Philaris aquatica, Amaranth, Paddy Melon (<i>Cucumis myriocarpus</i>), Clover, Medicago sp, Malva sp, Eleusine sp,
	Erosion along rocky slope now covered with groundcover	Native	1	1	2	1	1	1.2	Climbing Salt bush (<i>Einadia nutans</i>), Yellow Box (<i>Eucalyptus melliodora</i>), Dock (<i>Rumex</i> sp), Purslane (<i>Portulaca oleracea</i>), Native geranium (<i>Geranium solanderi</i>), Eragrostis sp
	Eucalypts showing signs of stress and dieback	Bare earth / rock	75	15	20	20	25	31	

Transect 3 Photo Monitoring Point



Q1



Q2

Inspection Proforma

Client: Hanson Quarry – East Guyong



Transect	Location description		Point					Cover %	Species present within and surrounding transect:
			1	2	3	4	5		
4	Grazed Paddock – north eastern extent	Priority Weeds	0	0	0	0	0	0	No priority weeds observed
	Erosion along slope	Other Weeds	95	90	85	95	80	89	Echium sp, Trifolium sp, Lepidium africanum, Variegated milk thistle, Solanum nigrum, Amaranth, Stinging Nettle (<i>Urtica dioica</i>), Mallow weed (<i>Malva</i> sp), Hawthorn (<i>Crataegus monogyna</i>), Spotted Clover, Hordeum sp, Erodium cicutarium, Fat Hen (<i>Chenopodium album</i>), Wild Oats, Medicago sp
	Eucalypts showing signs of stress and dieback	Native	0	0	0	0	0	0	
	Heavily grazed including rabbits, Kangaroos	Bare earth / rock	5	10	15	5	20	11	

Transect 4 Photo Monitoring Point



Q1



Q2

Inspection Proforma

Client: Hanson Quarry – East Guyong



Transect	Location description		Point					Cover %	Species present within and surrounding transect:
			1	2	3	4	5		
5	Revegetated earth bund / embankment adjacent spillway	Priority Weeds	0	0	0	0	0	0	Blue Heliotrope observed outside the transect
		Other Weeds	18	14	78	45	25	36	Pigweed (<i>Chenopodium album</i>), Variegated Thistle, Amaranth, Horehound, Philaris aquatica, Echium sp, Flatweed, Erodium cicutarium, Solanum nigrum, Trifolium sp, Medicago sp,
		Native	2	1	2	0	0	1	Purslane, Einadia nutans, Rumex sp
		Bare earth / rock	80	85	20	55	75	63	

Transect 5 Photo Monitoring Point



Q1



Q2

Mud map / sketch of site

Location of priority weeds recorded, notable weed extents, significant features etc

Provided as kml. file.

Appendix 1 – 1 m x 1 m cover plot photos from site inspection

Transect	Point 1	Point 2	Point 3	Point 4	Point 5
1					
2					
3					
4					
5					

Inspection Proforma

Client: Hanson Quarry – East Guyong



Conducted By	Emily Cotterill & Pandora Holliday	Weather conditions	Cool and sunny, patchy high cloud, moderate winds
Date/s Conducted	2 nd September 2020	Location	East Guyong Hanson Quarry

Summary and recommendations:

The Environmental Factor (TEF) were engaged to complete quarterly weed inspections at the Hanson Quarry East Guyong site. The following report documents the results of the third quarter weed cover monitoring transects, and outcomes of visual observations taken across the entire quarry site.

The weed survey was conducted as follows:

- The five (5) x 50 m transects established across the site were revisited to document changes to the structure and composition of groundcovers in these areas, with 1 m x 1 m ground cover/litter plots recorded at intervals of 10 m (at 5 m, 15 m, 25 m, 35 m and 45 m respectively) along each established transect
- All accessible areas were traversed by vehicle, or on foot where safe to do so, by two (2) qualified ecologists
- Weeds observed were marked with a handheld GPS device, and collated into a single kmz file to enable ease of viewing for future reference, and
- Results were then collated herein, including photographic records of the five (5) transects established (refer Transect 1, Transect 2, Transect 3, Transect 4, and Transect 5), and all litter plots completed (Appendix 1).

Several Priority weeds noted within the Central Tablelands Regional Strategic Weed Management Plan (2017-2022), in accordance with the *Local Land Services Act 2013* (LLS Act) have been recorded within the Hanson Quarry site. Other notable weeds have also been identified. Recommendations for management have been included where appropriate in the following tables. All weeds recorded during the first and second survey were observed on site; some had set seed and foliage had died-back as part of seasonal transition. Broad leaf weeds are colonising large areas of the site following recent late winter rain.

Notably, several of the broad-leafed weeds observed during the second quarter weed survey are actively growing (as at 2nd September 2020), and would be susceptible to control via foliar spray if Hanson were in a position to execute this during spring or early summer.

Inspection Proforma

Client: Hanson Quarry – East Guyong

Weed	Weed listing and General Biosecurity Duty (GBD) under LLS Act	Location	Management recommendation	Photo
Echium/Paterson's Curse (<i>Echium plantaginium</i>)	Not listed however at the current levels; it reduces pasture productivity and is toxic to livestock. It can degrade the natural environment, compromising habitat values by crowding out and suppressing native vegetation.	The current dominant weed occurring across grazing paddocks, scattered within the rehabilitation area, along Sales Pit boundaries and blanketing the bunds.	This species grows and fruits in response to winter rainfall. This extensive weed has not gone to flower and set seed. Prompt herbicide spray completed to ensure seed is not set this season is <u>strongly recommended</u>.	
Black Nightshade (<i>Solanum nigrum</i>)	Not listed, however can be toxic to grazing stock	Scattered throughout the quarry along the revegetated bunds and Sales Pit boundary, and scattered throughout grazing paddocks. Currently has set seed and foliage had died-back.	This species grows and fruits in response to autumn/winter rainfall. If broadscale herbicide foliage spraying is progressed this species can be targeted too.	

Inspection Proforma

Client: Hanson Quarry – East Guyong



Weed	Weed listing and General Biosecurity Duty (GBD) under LLS Act	Location	Management recommendation	Photo
Scotch Thistle (<i>Onopordon acanthium</i>)	Community Concern list - Regional	Scotch Thistles have established within the pit area on exposed bare earth and rocks. Also present within grazed paddocks.	Late season rains are likely to encourage renewed growth. A combination of herbicide leaf spray on new rosettes and chipping of mature plants concerntrating along the boundaries of the Sales Pit is recommended.	
Nodding Thistle (<i>Carduus nutans</i>)	Community Concern list - Regional	Nodding Thistles have established within the pit area on exposed bare earth and rocks.	A combination of herbicide leaf spray on new rosettes and chipping of mature plants concerntrating along the boundaries of the Main Pit is recommended.	

Inspection Proforma

Client: Hanson Quarry – East Guyong



Weed	Weed listing and General Biosecurity Duty (GBD) under LLS Act	Location	Management recommendation	Photo
Bathurst Burr (<i>Xanthium spinosum</i>)	Community Concern list - Regional	Bathurst Burr is present within the pit area scattered along exposed soils Currently has set seed and foliage had died-back.	A combination of herbicide leaf spray on young growth and chipping of plants is recommended, with concentrated management during Spring growth period. Recommended to remove seed where evident.	
Willow (<i>Salix</i> sp)	Weed of National Significance State Priority Weed Asset Protection – Sate Community Concern list - Regional	An individual sapling is present between the ponds.	Pulling out this sapling while small or cutting and painting the open stem with herbicide is the recommended control.	

Inspection Proforma

Client: Hanson Quarry – East Guyong

Weed	Weed listing and General Biosecurity Duty (GBD) under LLS Act	Location	Management recommendation	Photo
Sweet Briar (<i>Rosa rubiginosa</i>)	Community Concern list - Regional	Individual located within north western rehabilitation area – open woodland.	Chipping of this individual and searches for any new growth should be undertaken.	
St John's Wort (<i>Hypericum perforatum</i>)	Priority Weed Asset Protection – Regional; Protect grazing land free of St John's wort	Area located along outer slope embankment of pit area adjacent and within rehabilitation area – open woodland.	Herbicide spraying of patches is recommended in summer and autumn. Maintaining ground cover will help minimise further infestation.	
Blackberry (<i>Rubus fruticosus</i> spp. agg.)	State and Regional Priority Weed Asset Protection – Regional; Protect primary production land, conservation and natural environments free of Blackberry	Blackberry stems scattered throughout rocky slopes near rehabilitation area – open woodland	Spot spraying with herbicide is recommended during periods of new growth.	

Inspection Proforma

Client: Hanson Quarry – East Guyong



Weed	Weed listing and General Biosecurity Duty (GBD) under LLS Act	Location	Management recommendation	Photo
Blue Heliotrope (<i>Heliotropium amplexicaule</i>)	Regional Community Concern Can be toxic to grazing stock	Adjacent to Hanson Quarry entrance from Mitchell Highway. Currently died back/dormant due to seasonal growth patterns.	Spot spraying with herbicide during new growth periods (late Spring, early Summer).	

Inspection Proforma

Client: Hanson Quarry – East Guyong



Monitoring transect results

Transect	Location description		Point					Cover %	Species present within and surrounding transect:
			1	2	3	4	5		
1	Regenerating woodland along rocky slope north west of site. Following recent rain broad leaf weeds are colonising Tree die back and presence of mistletoe Evidence of grazing by rabbits and eastern grey kangaroos– scats, diggings and burrows	Priority Weeds	0	0	0	0	0	0.0	Blackberry (<i>Rubus</i> sp)
		Other Weeds	65	20	74	40	95	58.8	Clover, (<i>Trifolium</i> sp), Echium sp, Variegated Thistle (<i>Silybum marianum</i>), Slender Thistle (<i>Carduus</i> sp), Common Stork's bill (<i>Erodium cicutarium</i>), Wild Oats (<i>Avena barbata</i>), Malva sp, Medic sp, Black Nightshade (<i>Solanum nigrum</i>), Hawthorn (<i>Crataegus monogyna</i>), Paddy Melon (<i>Cucumis myriocarpus</i>), Catsear (<i>Hypochaeris radicata</i>), Phalaris (<i>Phalaris aquatica</i>), Mallow weed (<i>Malva</i> sp), Horehound (<i>Marrubium vulgare</i>), Barley Grass (<i>Hordeum</i> sp), Clary Sage (<i>Salvia verbenaca</i>), Saffron Thistle (<i>Carthamus lanatus</i>), Shepherd's Purse (<i>Capsella bursa-pastoris</i>), Prickly Lettuce (<i>Lactuca serriola</i>), Capeweed (<i>Arctotheca calendula</i>), Prairie Grass (<i>Bromus catharticus</i>), Hemlock (<i>Conium maculatum</i>), Wireweed (<i>Polygonum aviculare</i>), Amsinckia (<i>Amsinckia</i> sp), Chickweed (<i>Stellaria media</i>)
		Native	10	15	1	0	1	5.4	Rytidiosperma sp, Swamp Dock (<i>Rumex brownii</i>), Geranium sp, Redgrass (<i>Bothriochloa macra</i>), Tall Speargrass (<i>Austrostipa bigeniculata</i>)
		Bare earth / rock	25	65	25	60	4	35.8	

Transect 1 Photo Monitoring Point



Q1



Q2



Q3

Inspection Proforma

Client: Hanson Quarry – East Guyong

Transect	Location		Point					Cover %	Species present within and surrounding transect:
			1	2	3	4	5		
2	Grazed Paddock	Priority Weeds	0	0	0	0	0	0	No priority weeds observed
		Other Weeds	98	95	95	90	95	94.6	Phalaris (<i>Phalaris aquatica</i>) Clover (<i>Trifolium sp.</i>), Wild Oats (<i>Avena barbata</i>), Medicago sp, Ryegrass (<i>Lolium sp.</i>), Bulbous Poa (<i>Poa bulbosa</i>), Winter Grass (<i>Poa annua</i>), Mouse-ear Chickweed (<i>Cerastium glomeratum</i>), Spear Thistle (<i>Cirsium vulgare</i>)
		Native	2	5	3	3	1	2.8	Swamp Dock (<i>Rumex brownii</i>), Wallaby Grass (<i>Rytidosperma sp</i>)
		Bare earth / rock	0	0	2	7	4	2.6	

Transect 2 Photo Monitoring Point



Q1



Q2



Q3

Inspection Proforma

Client: Hanson Quarry – East Guyong



Transect	Location description		Point					Cover %	Species present within and surrounding transect:
			1	2	3	4	5		
3	Grazed Paddock small patch of open woodland canopy eastern extent of site Erosion along rocky slope now covered with groundcover Eucalypts showing signs of stress and dieback	Priority Weeds	0	0	0	0	0	0	No priority weeds observed
		Other Weeds	90	80	98	98	44	82	Echium sp, Amaranth, Variegated Thistle (<i>Silybum marianum</i>), Amaranth, Paddy Melon (<i>Cucumis myriocarpus</i>), Clover (<i>Trifolium</i> sp.), Medicago sp, Malva sp, Eleusine sp, Phalaris (<i>Phalaris aquatica</i>), Clover (<i>Trifolium</i> sp), Wild Oats (<i>Avena barbata</i>), Medicago sp, Ryegrass (<i>Lolium</i> sp.), Bulbous Poa (<i>Poa bulbosa</i>), Winter Grass (<i>Poa annua</i>), Mouse-ear Chickweed (<i>Cerastium glomeratum</i>), Saffron Thistle (<i>Carthamus lanatus</i>), Shepherd's Purse (<i>Capsella bursa-pastoris</i>), Barley Grass (<i>Hordeum</i> sp.), Common Storks-bill (<i>Erodium cicutarium</i>), Hedge Mustard (<i>Sisymbrium officinale</i>)
		Native	2	0	1	1	1	1	Climbing Salt bush (<i>Einadia nutans</i>), Ribbon Gum (<i>Eucalyptus viminalis</i>), Native geranium (<i>Geranium solanderi</i>), Eragrostis sp Swamp Dock (<i>Rumex brownii</i>), Wallaby Grass (<i>Rytidosperma</i> sp), Common Woodruff (<i>Asperula conferta</i>)
		Bare earth / rock	8	20	1	1	55	17	

Transect 3 Photo Monitoring Point



Q1



Q2



Q3

Inspection Proforma

Client: Hanson Quarry – East Guyong



Transect	Location description		Point					Cover %	Species present within and surrounding transect:
			1	2	3	4	5		
4	Grazed Paddock – north eastern extent	Priority Weeds	0	0	0	0	0	0	No priority weeds observed
	Erosion along slope	Other Weeds	85	90	84	79	85	84.6	Echium sp, Saffron Thistle (<i>Carthamus lanatus</i>), Variegated Thistle (<i>Silybum marianum</i>), Stinging Nettle (<i>Urtica dioica</i>), Clover, (<i>Trifolium</i> sp), Common Stork's bill (<i>Erodium cicutarium</i>), Wild Oats (<i>Avena barbata</i>), Medic sp, Hawthorn (<i>Crataegus monogyna</i>), Catsear (<i>Hypochaeris radicata</i>), Mallow weed (<i>Malva</i> sp), Horehound (<i>Marrubium vulgare</i>), Barley Grass (<i>Hordeum</i> sp), Shepherd's Purse (<i>Capsella bursa-pastoris</i>), Prairie Grass (<i>Bromus catharticus</i>), Chickweed (<i>Stellaria media</i>), Bulbous Poa (<i>Poa bulbosa</i>), Winter Grass (<i>Poa annua</i>), Musky Storks-bill (<i>Erodium moschatum</i>)
	Eucalypts showing signs of stress and dieback	Native	0	0	1	1	5	1.4	Swamp Dock (<i>Rumex brownii</i>), Crassula sp. Wallaby Grass (<i>Rytidosperma</i> sp.)
	Heavily grazed including sheep, rabbits, Kangaroos	Bare earth / rock	15	10	15	20	10	14	

Transect 4 Photo Monitoring Point



Q1



Q2



Q3

Inspection Proforma

Client: Hanson Quarry – East Guyong

Transect	Location description		Point					Cover %	Species present within and surrounding transect:
			1	2	3	4	5		
5	Revegetated earth bund / embankment adjacent spillway Following recent rain broad leaf weeds are colonising	Priority Weeds	0	0	0	0	0	0	
		Other Weeds	94	99	99	99	94	97	Echium sp, Saffron Thistle (<i>Carthamus lanatus</i>), Wild Oats (<i>Avena barbata</i>), Medic sp, Mallow weed (<i>Malva</i> sp), Horehound (<i>Marrubium vulgare</i>), Prairie Grass (<i>Bromus catharticus</i>), Prickly Lettuce (<i>Lactuca serriola</i>), Prickly Sow Thistle (<i>Sonchus asper</i>), Rye Grass (<i>Lolium</i> sp.), Cocksfoot (<i>Dactylis glomerata</i>). Present but died back: Black Nightshade (<i>Solanum nigrum</i>), Fat Hen (<i>Chenopodium album</i>)
		Native	1	1	1	1	1	1	Geranium sp.
		Bare earth / rock	5	0	0	0	5	2	

Transect 5 Photo Monitoring Point



Q1



Q2



Q3

Inspection Proforma

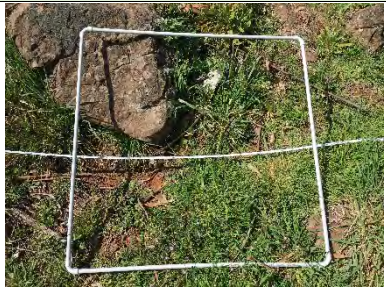
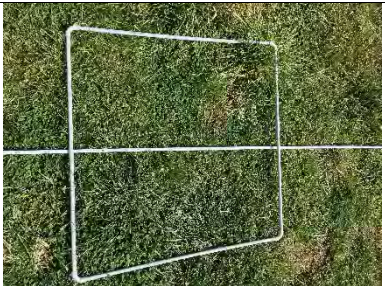
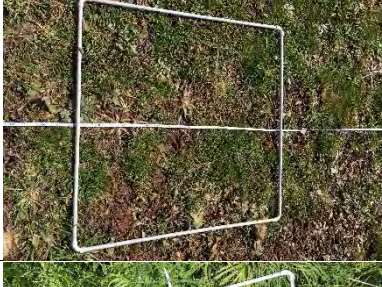
Client: Hanson Quarry – East Guyong

Mud map / sketch of site

Location of priority weeds recorded, notable weed extents, significant features etc

Provided as kml. file.

Appendix 1 – 1 m x 1 m cover plot photos from site inspection

Transect	Point1	Point2	Point3	Point4	Point5
1					
2					
3					
4					
5					

Hanson East Guyong Quarry pit expansion area Pre-clearance Survey Report

Prepared for Hanson Pty Ltd



East Guying Quarry Pre-clearance survey report

Document Verification

Revision	Author/s	Internal Review	Date submitted	Client Review and Approval	
				Name	Date
1	J Dessmann	E Cotterill	21/05/2020		

EnviroFact Pty Ltd, T/A The Environmental Factor

P.O. Box 268 Bathurst NSW 2795

ABN: 37 607 339 131

Ph: 0419 432 208

www.envirofact.com.au

This Report has been prepared by The Environmental Factor (TEF) at the request of Hanson Pty Ltd (Hanson) to document the pre-clearing steps taken to protect native fauna and biodiversity values within the approved pit expansion area at their East Guyong quarry, NSW. This document is not intended to be utilised or relied upon by any persons other than Hason, nor to be used for any purpose other than that articulated above. Accordingly, TEF accepts no responsibility in any way whatsoever for the use of this report by any other persons or for any other purpose.

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1 RESULTS OF THE PRE-CLEARANCE SURVEY

The Environmental Factor (TEF) was engaged by Hanson Pty Ltd to complete a pre-clearing inspection of vegetation requiring removal as part of the approved quarry pit expansion area at East Guyong Quarry, NSW. The pre-clearing survey was completed on the 19th May 2020 to identify any habitat features on site likely to be impacted as part of the proposed clearing works e.g. hollow-bearing trees or limbs, bark fissures, nests and burrows.

1.1 Tree flagging system

The trees flagged with **orange** flagging tape on site were selected based on the assumed or confirmed presence of hollows, burrows or nests observed during the pre-clearing survey. These trees and habitat features must be carefully managed during the clearing process.

1.2 Trees to be removed

Thirteen (13) trees and stags were observed to contain (or potentially contain) hollows, nests or denning evidence during the pre-clearance survey.

Refer to Table 1 for the locations and details of the trees / features marked during the pre-clearing survey.

1.3 Weeds

Several known priority weeds and notable agricultural weeds occur in the vicinity. Care must be taken to prevent the spread of weeds during all clearing activities particularly given the location adjacent the rehabilitation area.

2 CLEARANCE PROTOCOL

The following advice is based on the vegetation clearing best practice biodiversity guidelines developed by RMS (2011).

After completion of the first stage of clearing, the following steps are required immediately prior to clearing the remaining mature and hollow-bearing trees; **note that a qualified fauna spotter-catcher should attend all tree/limb felling works:**

1. Visual inspection of ALL trees / burrows to be cleared (those marked with orange flagging tape) for occupation by fauna (within hollows, bark fissures and nests, if present).
2. Gently knocking tree with excavator to disturb any unseen fauna that may be present in fissures or hollows.
3. Removal of fauna present (where possible) or leaving tree standing until fauna have moved.
4. Following the satisfaction of the supervising ecologist / or Contractor representative overseeing works, gently lower tree using excavator or hollow bearing limbs to the ground.
5. It is preferable to removal hollow limbs from the tree either with grab attachment or cutting well below hollow of limb with a chain saw to allow the hollow to be retained as habitat in adjacent vegetation. Hollow limb can be securely installed as an elevated hollow within a suitable tree being retained or on the ground where this is not feasible.
6. Lay medium sized trunks in adjacent rehabilitation area for beneficial reuse. Chip smaller branches and spread onsite where possible to reduce erosion; or, transport woodchip offsite for beneficial reuse where space does not allow. Do not stockpile large trunks – this creates denning habitat for exotic fauna (foxes and rabbits).

Table 1 Clearing Directives and Management Procedures

Identifier	Location	Habitat features	Image	Outcome
T1	33°24'24.23"S 149°14'47.42"E	Fissured bark and small / medium hollows suitable for microbats. Burrow at base of tree (likely rabbits) – should be checked prior to earth works activities to ensure animals are not crushed in burrow.		
T2	33°24'21.24"S 149°14'49.20"E	No hollows or nests observed		

Identifier	Location	Habitat features	Image	Outcome
T3	33°24'18.84"S 149°14'49.15"E	No hollows or nests observed		
T4	33°24'18.05"S 149°14'49.59"E	Large stag with fissured bark and stem hollows suitable for microbats		

Identifier	Location	Habitat features	Image	Outcome
T5	33°24'17.04"S 149°14'50.59"E	Stag with small hollow		
T6	33°24'17.10"S 149°14'50.46"E	1 x small 1 x medium hollow		

Identifier	Location	Habitat features	Image	Outcome
T7	33°24'17.03"S 149°14'50.75"E	Several small hollows		
T8	33°24'16.39"S 149°14'50.66"E	Hollow bearing stag		

Identifier	Location	Habitat features	Image	Outcome
T9	33°24'16.20"S 149°14'50.63"E	Large stem hollow		
T10	33°24'16.45"S 149°14'51.03"E	Stag with trunk hollow – nesting material visible – likely older nest possibly Wood Duck or Brushtail Possum		

Identifier	Location	Habitat features	Image	Outcome
T11	33°24'16.43"S 149°14'50.88"E	Several small hollows		
T12	33°24'16.32"S 149°14'50.92"E	Tree hollow		

Identifier	Location	Habitat features	Image	Outcome
T13 & T14	33°24'16.43"S 149°14'50.83"E	Small stags and stockpiled timber – evidence of rabbits, foxes and kangaroos sheltering		
T15	33°24'15.36"S 149°14'50.97"E	Several hollows in trunk and stems		

3 REFERENCES

Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects Revision 0/September 2011

Hanson East Guyong Quarry pit expansion area Western Visual Boundary Screen Assessment Report

DRAFT

Prepared for Hanson Pty Ltd



DRAFT East Guyong Quarry Vegetation Integrity Condition Report

Document Verification

Revision	Author/s	Internal Review	Date submitted	Client Review and Approval	
				Name	Date
0.1	J Dessmann	E Cotterill	04/03/2021		

EnviroFact Pty Ltd, T/A The Environmental Factor

P.O. Box 268 Bathurst NSW 2795

ABN: 37 607 339 131

Ph: 0419 432 208

www.envirofact.com.au

This Report has been prepared by The Environmental Factor (TEF) at the request of Hanson Pty Ltd (Hanson) to document the Vegetation Integrity and condition of screening vegetation plantings at East Guyong quarry, NSW. This document is not intended to be utilised or relied upon by any persons other than Hanson, nor to be used for any purpose other than that articulated above. Accordingly, TEF accepts no responsibility in any way whatsoever for the use of this report by any other persons or for any other purpose.

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1 INTRODUCTION

The Environmental Factor (TEF) was engaged by Hanson Pty Ltd to complete an assessment of the condition and species assemblage of recent plantings undertaken as part of the western screening vegetation at the Hanson East Quarry, at Guyong in NSW. The inspection was completed in November 2020 in the form of a vegetation condition assessment in accordance with the Biodiversity Assessment Method (BAM), resulting in data collection to be used to ascertain an overall Vegetation Integrity (VI) score and species assemblage list to determine how closely the plantings resemble the historical Plant Community type, PCT 275 *Herbaceous White Box - Apple Box valley woodland of the NSW central western slopes* benchmark conditions.

The Landscape Management Plan (LMP) for the Hanson East Quarry requires that the Western Boundary Visual Screen will be assessed regularly, and managed appropriately, to ensure that planted vegetation densities converge with the benchmark density and cover values identified for PCT 275.

2 AIMS OF THIS REPORT

This report provide details of the initial assessment of the recent tubestock plantings within the Western Visual Boundary Screen of the East Guyong Quarry.

It forms the baseline and first assessment of VI calculated in accordance with the BAM, with biennial assessment proposed to follow thereafter.

The site inspection was intended to confirm the correct species assemblages were used in revegetation activities, consistent with the historical PCT 275 present within the adjacent rehabilitation area.

3 METHODOLOGY

3.1 Desktop Assessment

Historical PCT

The PCT 275 was nominated by Umwelt (2018), as part of the investigation to support the Environmental Assessment . This PCT 275 has since been used within the LMP to set appropriate thresholds for plantings within visual screening areas on site. It is of note that the flora assessment undertaken by Geoff Cunningham Natural Resource Consultants Pty Ltd (GCNRC; 2006), described the woodland vegetation community as Ribbon Gum – Apple Box Community which includes the remnant *Eucalyptus viminalis* present on site. This is more closely aligned with the current PCT mapping for the site, which identifies PCT 1101 *Ribbon Gum – Snow Gum grassy open forest on flats and undulating hills of the eastern tableland* (Figure 1).

Flora data was analysed using the using the online BAM calculator to determine VI scores. The calculator uses the rules and calculations outlined in the BAM (BAM, NSW Government 2017) and provides a scientific and repeatable calculation of the biodiversity values of a site.

Vegetation Integrity scores

The vegetation integrity score represents the degree to which the composition, structure and function of the vegetation type at a site differs from the best-on-offer condition of a nominated PCT generally. Best-on-offer sites are those sites within the contemporary landscape with higher numbers of native

plant species, greater structural complexity and that are replete with functional components, relative to other sites within the same vegetation type and bioregion (OEH 2017).

Background context

Mitchell Soil Landscape mapped as occurring across the majority of the East Guyong quarry site are Canobolas Sheet Basalts.

These soils are described as widespread undulating high-level plains on Tertiary basalt flows. General elevation 950 to 1200m, local relief 100m. Shallow red brown to black stony loams, yellow-brown texture contrast soils on lower slopes, alluvial loams and black clays in swampy valley floors. Woodland with; yellow box (*Eucalyptus melliodora*), Blakely's red gum (*Eucalyptus blackelyi*), red stringybark (*Eucalyptus macrorhyncha*), candlebark (*Eucalyptus rubida*), broad-leaved peppermint (*Eucalyptus dives*), grey box (*Eucalyptus microcarpa*), and apple box (*Eucalyptus bridgesiana*) with grasses.

Native vegetation cover occurring throughout the locality is sparse, with an estimated <10% native vegetation cover occurring within the 1.5 km radius.

A list of species planted and densities was not supplied to inform this assessment. Vegetation screen planting was restricted to the upper slope along the immediate boundary of the active quarry site. The second nominated vegetation screen along the western perimeter described in the LMP was not planted as this location at the base of the hill would not provide any visual screening to the quarry activities (pers comm. M Curran). Ecoscape (the contractor engaged to completed the plantings) confirmed that approximately 200 tubestock were planted with weed mats soaked in De-Ter animal and bird repellent, as part of the watering regime to dissuade herbivory. Tubestock planted included Eucalypt and Acacia species consistent with the species assemblage list outlined within the Landscape Management Plan (Table 1) (Mick Curran pers comm Nov 2020).

Table 1 Revegetation targets outlined within the LMP for the Western Boundary Visual Screen (Table 6 of LMP)

Species	Common Name	Proportion of each species (%)
Canopy species		
<i>Eucalyptus bridgesiana</i>	Apple Box	50%
<i>Eucalyptus viminalis</i>	Ribbon Gum	50%
Groundcover Species		
<i>Austrostipa scabra</i>	Speargrass	20%
<i>Einadia nutans</i>	Climbing Saltbush	20%
<i>Geranium solanderi</i> var. <i>solanderi</i>	Austral Cranesbill	20%
<i>Chenopodium album</i>	Fat Hen	20% note that this is an exotic species and should not have been used in the planting list.
<i>Bothriochlona macra</i>	Red Grass	20%

3.2 Field investigation

Two (2) TEF ecologists trained in the application of the Biodiversity Assessment Method (BAM), Josephine Dessmann (Accredited Assessor BAAS 18128) and Pandora Holliday, completed the inspection of the recent plantings on 9th November 2020. Surveys were conducted using the

Biodiversity Assessment Method (BAM, NSW Government, 2017) which provides a consistent method for the assessment of biodiversity, and captures the following information:

- Native vegetation cover.
- PCT within the plot based on the composition and structure of floristics present as well as evidence and justification of decision pathway used in identification of PCT (e.g. vegetation structure and landscape position/geomorphology).
- A 20 m x 50 m or 10 x 100m plot assessing diameter breast height (DBH), total length of logs, plot disturbance, age structure of tree, and tree hollow presence. Five 1m² sub-plots were used to assess ground cover (litter, rock, bare earth, cryptogam).
- Quantitative floristics of all plant cover within a 20 m x 20 m or 10 x 40m plot including stratum, growth form, species name, cover and abundance rating.

In addition, GPS coordinates, bearings from the midline and pictures at the start of each midline were taken, notes were also made of any disturbance, habitat degradation or other noteworthy observations in relation to the habitat.

Two (2) plots were completed. The first was completed along the upper fenceline where plantings were evident, and a second plot beneath remnant canopy downslope to provide a local comparison of vegetation condition. The locations and dimensions of these plots are detailed in Table 2 and Figure 2. The survey used the 100m plot survival rate to provide a reflection of overall tubestock planting survival. Fourteen (14) tubestock were encountered as two (2) rows of planting spaced approximately 5 m apart, evidenced by stakes and weed mats.

Table 2 Plot locations

Plot #	GPS coordinates	Description
1	Start -33.407978, 149.244893 Finish -33.407377; 149.245656	10 x 100 m plot extending along the top ridge where visual screening vegetation was planted along the fenceline to the extraction area.
2	Start -33.406612; 149.245586 Finish -33.406187; 149.245776	20 x 50m plot completed beneath the canopy of remnant vegetation to provide an onsite comparison of local plot characteristics.

The data collected included composition, vegetative cover and habitat functionality attributes. These data are used to measure the VI for future reference against the nominated plant community present in order to categorise the Plant Community Type (PCT). Plot datasheets are presented as Appendix 1.

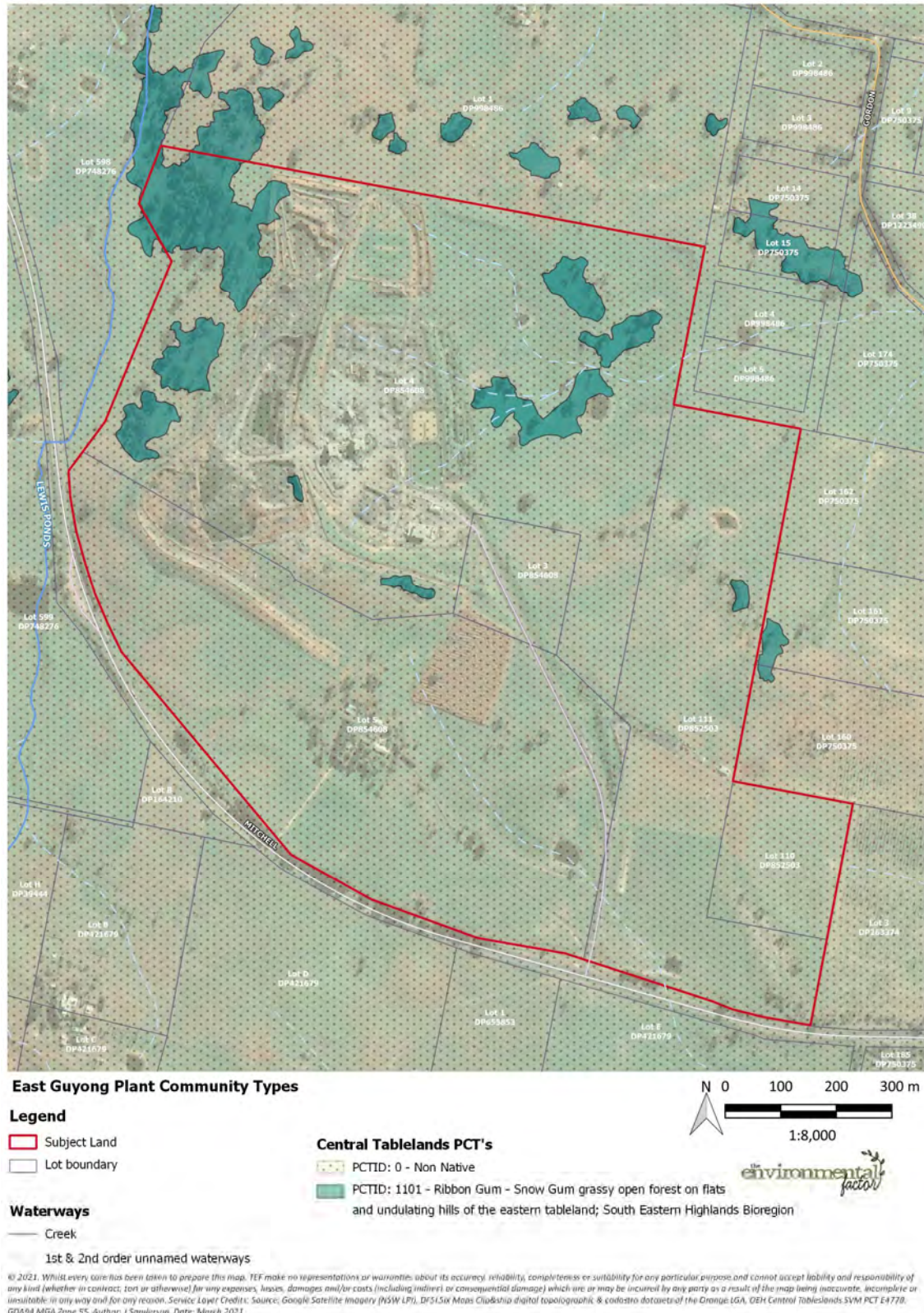


Figure 1 Plant Community Types mapped in proximity to the quarry



Figure 2 Survey effort and BAM plot locations

4 RESULTS

4.1 Benchmark values

The results of the BAM plots were compared against benchmark vegetation data available for the historical *PCT 275 Herbaceous White Box - Apple Box valley woodland of the NSW central western slopes* to provide an indication of the overall quality of the vegetation community.

Results from the current BAM floristics survey are presented below (Table 3, Table 4, Table 5). Flora results have been obtained from the two (2) BAM plots completed – one (1) completed within the Western Visual Screening planting area (Plot 1) and the second within the adjacent woodland vegetation (Plot 2). These results have been compared with Benchmark values for PCT 275 obtained through the BAM Calculator. The current survey confirms that the VI scores fall below benchmark VI for PCT 275 as assessed.

Overall, the comparison of the quantitative floristic data collected against the benchmark PCT data available via the BAM calculator, revealed that the benchmark data does not accurately reflect the PCT 275 nominated as present.

The VI score takes into consideration habitat components such as large trees, litter, fallen logs, and strata present which are absent from the recently planted vegetation screens. On comparison with the benchmark data available for the nominated PCT 275, it is evident that the vegetation integrity (VI) score is poor reflecting a lack of species and structural diversity, as well as functional habitat components.

Table 3 Summary of VI score results for each plot completed

Plot	PCT	Composition	Structure	Function	VI score
1	275	44.1	2.5	19.4	12.9
2	275	44.1	39.2	24.9	35.1

Table 4 Vegetation composition and structure

Plot	Trees		Shrubs		Grasses		Forbs		Ferns		Other	
	N. spp	Cover	N. spp	Cover	N. spp	Cover	N. spp	Cover	N. spp	Cover	N. spp	Cover
1	1	2	0	0	5	5.5	6	0.6	0	0	0	0
2	1	15	0	0	5	15.4	6	3.6	0	0	0	0
Benchmark	3	12	5	2	10	48	11	9	1	0	2	0

Table 5 Vegetation function

Plot	# Large trees dbh 50 cm	Logs (m)	Litter cover	Regenerating stems	Stem diversity
1	0	0	12	Present (planted tubestock only)	1
2	1	6	10	Absent	1
Benchmark	2	34	35	Present	4

4.2 Observations

It is stated in the LMP that planting densities are expected to be higher than benchmark values to account for losses associated with tubestock mortality and harsh climatic conditions, however this was not the case. In the assessment completed in early November 2020, mortality rates had been very high (86%) with only two (2) out of fourteen (14) tubestock encountered having survived. Most of the tubestock appeared to have been foraged based on rabbit diggings and scats at the planting locations and no remaining stems of tubestock.

The results of this investigation provide an insight into the recently planted screening vegetation present. It confirms that each of the plots sampled are not in benchmark condition suggesting that the composition, cover and habitat components are lacking. This reflects the current condition as well as past disturbances such as clearing events, bushfire and recent drought conditions preceding the survey.

Below is a summary of observations:

- Survival rate is currently 14% (2 out of 14 tube stock encountered within the 10 m x 100 m vegetation plot) which captured a portion of the recent tube stock plantings. Ecoscape indicated that two-hundred (200) tubestock, a mixture of Eucalypts / Acacias, had been planted in two (2) rows spaced 3-5 m apart (Mick Currans pers comm Nov 2020). This density is consistent with what was observed on site.
- Based on the abundance of rabbit droppings, diggings, burrows, roadkill and live animals observed during the day, and that many of the tube stock were no longer present, herbivory is a contributing reason for the high mortality rate of tube stock.
- It is also noted that it is a rocky slope with little topsoil and heavy weed infestation, within which it will be difficult to establish vegetation. Tube stock mortality is generally high, but it is not expected that more established tree planting would result in better survival given the aspect and soil profile.
- Dominant weeds in flower at the time of survey were Patterson's Curse, Milk Thistle, St John's Wort, and Slender Thistle, while a large area of Saffron Thistle was just about to flower / set seed (Nov 2020). Slashing of Saffron Thistle within 1-2 weeks of maturity would be an effectively action to stop seed being set as part of future site management.
- Following the drought there was a lot of exposed bare earth and with the subsequent rainfall has resulted in a very prolific season for many weeds, particularly Echium sp. This has been observed to be the case across the region.

4.3 Survey conditions

During the survey period, conditions were conducive to carrying out floristic plots and temperature and winds recorded were within the monthly averages (BOM 2020). However, surveys were completed following an incredibly severe (hot and dry) 2019 summer season followed by wet 2020 seasonal conditions. This combination of weather conditions has promoted a strong growth season particularly for many agricultural weeds including Patterson's Curse (*Echium plantagineum*) and Slender Thistles (*Carduus pycnocephalus*), as previously stated, which were prevalent across the Hanson East Guyong Quarry site.



Plate 1 Plot 1 facing north west within vegetation screen area



Plate 2 Plot 1 facing south east



Plate 3 Plot 2 facing north west within rehabilitation area



Plate 4 Plot 2 facing south east

Plot 1



Plate 5 Plot 1 litter cover plots

Plot 2



Plate 6 Plot 2 litter cover plots



Plate 7 - Plate 8 Sapling surviving with other examples of tubestock mortality



Plate 9 - Plate 10 Evidence of rabbits – diggings, scats and burrows

5 RECOMMENDED ACTIONS

The nominated location of the vegetation screen along the top of an embankment has several challenges including being on rocky ground on a steep slope with little topsoil. These characteristics affect the likely success of plantings and create hurdles for maintenance where machine slashing, hand slashing and ecological burns to manage biomass are difficult to implement. With these challenges in mind the following factors must be considered in order to achieve an effective visual screen that also incorporates biodiversity values, and invest resources strategically into practices which will more effectively improve ecological functioning and assist trends toward benchmark values for the local PCT.

5.1 Vegetation screen vs ecological enhancement

The LMP refers to these planting areas as vegetation screens, however the placement of one (1) of these screens, nominated for along the site perimeter, was not planted at this boundary location as it would not actually serve as a vegetation screen in that position. However, the LMP acknowledges that the vegetation screens have the dual purpose of providing screening during the active quarry life and also to contribute to the rehabilitation area adjacent, hence the requirement to meet PCT benchmark thresholds.

The objectives of each of the visual screens and rehabilitation areas will be difficult to be achieved effectively with the current approach. It is recommended to consider separate solutions to achieve each of these outcomes i.e. visual screening and rehabilitation.

The LMP stipulates that vegetation screen coverage of approximately 75% must be achieved on the eastern and northern faces of the Extraction Area prior to commencing extraction in the western section of the Extraction Area as approved under MOD 2 (S10.3.4 p29 LMP).

Generally, management of the site to improve ecological values will require consistency and regular adaptive actions, responding to climatic conditions and weed seeding times. A visual screen may be more effectively and efficiently achieved through a visual bund erected within the active quarry boundary. If this course of action is progressed it must be endorsed by DPIE and undertaken in consultation with the community. Sediment fences or otherwise must be in place and maintained until soils are stabilized to ensure soils are not washed down slope.

5.2 Appropriate thresholds

The recent tubestock plantings do not meet the thresholds nominated within the LMP (due to mortality), however these thresholds also do not reflect the benchmark characteristics for PCT 275.

It is recommended that the benchmark thresholds for PCT 275 should instead be used which reflect a more open grassy woodland community resembling the remnant vegetation within the rehabilitation area (Table 6). In addition to foliage coverage, species diversity and functional ecological characteristics should also be taken into consideration.

Supplementary planting should be timed to align with conducive seasonal conditions in autumn or spring with weed and pest management preceding planting events to ensure tubestock survival is greatest.

The planting species list should not include exotic species (i.e. *Chenopodium album*). Instead, it is recommended that a similarly robust native associated with PCT 275 be included in instead (i.e. *Urtica incisa* or *Hydrocotyle laxiflora*).

Table 6 Current vegetation characteristics against thresholds nominated within LMP for the Western Boundary Visual Screen (Table 6 of LMP) and PCT 275 Thresholds (Biodiversity Calculator 2021)

Species	Common Name	Threshold proportion of each species (%)	Plot 1 current condition Nov 2020	PCT 275 benchmark thresholds
Canopy species				
<i>Eucalyptus bridgesiana</i>	Apple Box	50%	0.1%	Tree cover 12% Shrub cover 2%
<i>Eucalyptus viminalis</i>	Ribbon Gum	50%	0%	
Groundcover Species				
<i>Austrostipa scabra</i>	Speargrass	20%	0.1% (<i>Austrostipa bigeniculata</i>)	Grass cover 48%
<i>Bothriochlora macra</i>	Red Grass	20%	0.2%	
<i>Einadia nutans</i>	Climbing Saltbush	20%	0.1%	Forb cover 9%
<i>Geranium solanderi</i> var. <i>solanderi</i>	Austral Cranesbill	20%	0%	
<i>Chenopodium album</i>	Fat Hen	20% note that this is an exotic species and should not be used in the planting list or as a threshold	0%	

5.3 Crash grazing as a biomass and weed management tool

Currently the vegetation fuel loads of the Quarry site are managed through grazing practices (LMP s10.3.9 Bushfire management), including ‘crash grazing’ of the rehabilitation areas noted in the LMP as a key management tool. Although the Quarry property is grazed by sheep, there does not appear to be a formal plan or agreement on the location and timing of grazing, with the objective to target weed infestations prior to flowering and seed setting. As such, the site is not considered to be crash-grazed at present.

Livestock grazing can be appropriate in grassy ecosystems where it can either maintain or enhance biodiversity values by controlling exotic weeds and/or managing grassy ‘biomass’, at stocking levels appropriate to the carrying capacity of the site to ensure the land does not become degraded by overgrazing.

Regular monitoring of ecological responses to grazing practices are essential to tailor the application of grazing pressure to suit the desired outcome. It is recommended that a site specific grazing plan be developed in consultation with the livestock owner currently grazing the quarry lands.

The specifics of the plan will need to be determined in consultation with the Quarry Manager and Environmental Manager, with consultation with the grazier, but will need to include the following:

- The plan must take into consideration Total Grazing Pressure which includes grazing by livestock as well as pest and native fauna.
- Establish appropriate healthy condition thresholds and site carrying capacity.
- Identify resting periods from livestock grazing.
- Identify appropriate grazing windows when undesirable weed species are coming into flower and prior to setting seed. Where permanent fencing does not exist, temporary electric fencing can be erected to contain livestock and ensure the appropriate grazing pressure and timing is achieved.
- Grazing regimes are flexible, responsive to seasonality and non-prescriptive within the boundaries of maintaining healthy condition of the vegetation on site and the grazing window. An effective crash grazing management plan will provide a cost effective and consistent management approach to managing weed biomass across a large portion of the quarry site including within the rehabilitation areas.
- Regular monitoring is a key component of the successful implementation of a grazing plan.

5.4 Pest management to control grazing pressure

Management of pest fauna is a requirement as part of the LMP. Based on the high mortality of the tubestock planting and many indicators of rabbit presence i.e. extensive warrens, diggings, scats, road kill and live animals observed throughout the middle of the day, it is evident that there are a medium to high density of rabbits on site contributing to the overall grazing pressure. The high population of rabbits on site may be a response to the recent mild wet season experienced during mid-late 2020, which has been conducive to rodent population growth.

In order to more effectively control the grazing pressure across the property it is necessary to reduce the numbers of rabbits present. It is recommended that an integrated management approach for rabbits be undertaken.

The specifics of the plan will need to be determined in consultation with the Quarry Manager, and the Environmental Manager, with consultation with the grazier, but will include the following:

- The initial objectives will be to reduce the density of rabbits through a combination of poison application completed outside of the breeding season (late summer) followed by burrow ripping. The use of poisons will carry through the food chain. This is of note for the resident Wedge-tailed Eagles which nest on site and the local owls likely to occupy the area. Removal of baited rabbit carcasses may be appropriate (however difficult to implement).
- Follow up control methods would include shooting and ferreting to keep densities low.
- Regular and systematic monitoring and record keeping are necessary to observe fluctuating pest species densities on site and to allow for prompt and strategic response to ensure numbers remain manageable.

6 CONCLUSION

As part of TEFs current engagement, we would like progress in collaboration with Hanson, a vegetation management action plan to outline an action schedule to effectively manage the site to improve the ecological robustness of the landscape and ensure there is resilience in the years to come. The benefits of an actively managed site for ecological values includes improved vegetation coverage minimising dust plumes, enhanced visual amenity and ecological resilience which will require reduced maintenance over time.

7 REFERENCES

- BCT (2018) Livestock grazing guidelines <https://www.bct.nsw.gov.au/sites/default/files/2019-04/BCT%20Grazing%20Guidelines%20Master%202018.pdf>
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- DPIE (2021) Pest management for rabbits <https://www.dpi.nsw.gov.au/biosecurity/vertebrate-pests/pest-animals-in-nsw/rabbits/rabbit-control>
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- Ecoscape Solutions pers comm Mick Curran Nov 2020
- OEH (2017) BAM
- RW Corkery (2020) Landscape Management Plan prepared for Hanson East Guyong Quarry

Appendix 1 BAM datasheets