

Gunlake Quarry



Air Quality Management Plan

March 2020

Document Control Details

DOCUMENT DETAILS		
Name:	Air Quality Management Plan	
Author:	Kirsty Nielsen	
Reference:		
Revision No.:	9	
Document Status	Operational	

REVISION DETAILS					
Revision No.	Date	Details of Revision	Reviewed By	Approved By	
1	2/11/09	Final for issue	Ed O'Neil	Ed O'Neil	
2	18/8/15	Management review	K Nielsen	Ed O'Neil	
3	26/8/15	Issue to EPA for review	Ed O'Neil	Ed O'Neil	
4	28/8/15	Final for issue	Ed O'Neil	Ed O'Neil	
5	20/1/16	Review in response to DPE comments	K Nielsen	Ed O'Neil	
6	5/5/16	Final for issue	Ed O'Neil	Ed O'Neil	
7	26/10/17	Update with 2017 Consent	K Nielsen	D Kelly	
8	13/4/18	Update with DPE comments	K Nielsen	D Kelly	
9	04/03/20	Management Review following first Independent Environmental Audit of 2017 Development Consent	K Nielsen	D Kelly	

CIRCULATION DETAILS		
Date	Department/Organisation	
2/11/09	Department of Planning	
18/8/15	Ed O'Neil Managing Director Gunlake Quarries	
26/8/15	EPA	
31/8/15	Department of Planning	
20/1/16	Ed O'Neil Managing Director Gunlake Quarries	
26/2/16	Department of Planning	
2/2/18	EPA	
16/4/18	DPE	

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1. Introduction

1.1 Overview

This Air Quality Management Plan has been prepared by Gunlake Quarries Pty Ltd (Gunlake) for Gunlake Quarry (the Quarry). The Quarry is located approximately 7 km northwest of Marulan, off the Brayton Road as shown on **Figure 1**, Appendix A.

Under Schedule 3, Condition 16 of the 2017 Development Consent, Gunlake is required to prepare and implement an Air Quality Management Plan (AQMP) in consultation with the NSW EPA, to be submitted to the Secretary of the Department of Planning, Industry and Environment (DPIE) for approval. The Development Consent conditions require the AQMP to include an air monitoring program, and a protocol for evaluating compliance with the relevant impact assessment criteria in the approval.

This version of the AQMP updates the previously approved plan dated April 2018 and represents the 9th revision since quarry operations began in 2009. This management review has been undertaken following the first Independent Environmental Audit of the SSD Development Consent.

The control of dust from the Quarry is a key environmental issue. The purpose of this AQMP is to document the control measures and management initiatives to control dust generation for the site.

The AQMP forms one component of the overall Project Environmental Management Strategy (EMS). The EMS includes a number of commitments and component management plans which together form the basis for the ongoing operation of the Gunlake Quarry.

1.2 Aims and Objectives

Gunlake seeks to meet all emission criteria as specified in the Development Consent and Environment Protection Licence (EPL). To achieve this, Gunlake will:

- ❑ Employ all reasonable and feasible avoidance and mitigation measures necessary to meet the assessment criteria contained in the Development Consent;
- ❑ Verify achievement of the stated criteria through effective monitoring; and
- ❑ Identify areas of non-compliance and effective measures to achieve continual improvement in line with current best practice.

1.3 Current Consent Requirements

Environmental performance provisions specifically relating to Air Quality are covered in Conditions 14 to 19 inclusive of Schedule 3 of the Development Consent. Conditions 14 and 17 details the air quality impact assessment criteria relevant to the Project and is discussed in Section 2.1. Condition 15 covers various operating conditions which are described in Section 4.1, while Condition 16 specifically deals with matters relevant to this

AQMP which are detailed in Table 1 below. Condition 18 and 19 relate to meteorological monitoring, and greenhouse gas emissions respectively.

The Environment Protection Licence (EPL) also contains conditions relevant to air quality impacts and monitoring.

Table 1 – Development Consent Conditions: Air Quality Management Plan

Condition	Requirement	Where Addressed
Schedule 3:	ENVIRONMENTAL PERFORMANCE CONDITIONS	
16	<p>Air Quality Management Plan The Applicant must prepare an Air Quality Management Plan for the development to the satisfaction of the Secretary. This plan must</p>	
(a)	Be prepared in consultation with the EPA	1.5
(b)	be submitted to the Secretary for approval within six months of commencing development under this consent and prior to commencing quarrying operations under this consent;	Noted
(c)	<p>describe the measures that would be implemented to ensure:</p> <ul style="list-style-type: none"> <input type="checkbox"/> compliance with the relevant conditions of this consent; <input type="checkbox"/> best practice management is being employed; and <input type="checkbox"/> the air quality impacts of the development are minimised during adverse meteorological conditions and extraordinary events; 	3
(d)	Describe the proposed air quality management system, including a minimum of two High Volume Air Samplers in locations agreed to by the EPA;	6.1
	<p>Include an air quality monitoring program that:</p> <ul style="list-style-type: none"> <input type="checkbox"/> is capable of evaluating the performance of the development; <input type="checkbox"/> includes a protocol for determining any exceedances of the relevant conditions of consent; <input type="checkbox"/> effectively supports the air quality management system; and <input type="checkbox"/> evaluates and reports on the adequacy of the air quality management system. 	3

1.4 Statement of Commitments

In addition to the Development Consent, the 2016 EIS made a number of commitments which form part of the approval. Section 17.3 of the EIS provided a summary of the Statement of Commitments and the relevant sections in relation to air quality management are provided below:

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- ❑ The existing air quality monitoring network will continue under the extension project. Monitoring results will be reviewed on an annual basis against the Environment Protection Licence (EPL) and approval conditions to determine if additional monitoring is required due to production increases.

 - ❑ The following additional management measures will be implemented to enable Gunlake to continue to manage potential air quality impacts effectively:
 - Compliance with USA-EPA Tier 3 or Tier 4 emissions standards, where practicable, for any new plant acquired by Gunlake; and
 - Consideration of the following factors during blast design:
 - Delaying blasting to avoid unfavourable weather conditions that are likely to cause or spread a blast fume;
 - Selecting an explosive product that is correct for the conditions;
 - Monitoring the amount of hydrocarbon (diesel) in the product;
 - Preventing water ingress into blast holes;
 - Dewatering before loading;
 - Keeping sleep time (the amount of time between charging and firing of a blast) to a minimum, well within manufacturer recommended times;
 - Providing effective stemming; and
 - Loading the product using the appropriate techniques.

1.5 Consultation

Gunlake Quarries undertakes regular consultation with regulatory authorities. This includes provision of updated versions of the AQMP and incorporation of comments received from government agencies into the documentation as necessary. Stakeholder consultation is included in Appendix B.

2. Air Quality Criteria

2.1 Impact Assessment Criteria

This AQMP complies with the following legislation:

- The Protection of the Environment Operations (Clean Air) Regulation 2010
- The Approved Methods for the Sampling and Analysis of Air Pollutants in NSW guideline (EPA, 2007)

In accordance with Schedule 3, Condition 14 of the Development Consent, all reasonable and feasible avoidance and mitigation measures are employed to ensure that particulate matter emissions generated by the development do not exceed the criteria listed in Table 6 of the Consent (reproduced in this report as Table 2.1), at any residence on privately-owned land.

An exceedance of any of these criteria constitutes an air quality incident

Table 2.1: Long Term Impact Assessment Criteria for Particulate Matter

Pollutant	Averaging Period	Criterion
Particulate matter < 10 µm (PM ₁₀)	Annual	a, d 30 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	24 hour	b 50 µg/m ³
Total suspended particulates (TSP)	Annual	a, d 90 µg/m ³
Deposited dust	Annual	b 2 g/m ² /month a, d 4 g/m ² /month

Notes to Tables 2.1:

- a Cumulative impact (ie increase in concentrations due to the development plus background concentrations due to all other sources).
- b Incremental impact (ie increase in concentrations due to the development alone, with zero allowable exceedances of the criteria over the life of the development).
- c 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.
- d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Secretary.
- e "Reasonable and feasible avoidance measures" includes, but is not limited to, the operational requirements in conditions 14, 15 and 16 to develop and implement an air quality management system that ensures operational responses to the risks of exceedance of the criteria.

In addition to the above condition, Gunlake is required to ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria listed in Table 6 of the Consent (reproduced in this report as Table 2.1) at any occupied residence on quarry-owned land unless:

- The tenant has been notified of any health risks associated with such exceedances in accordance with the notification requirements under Schedule 4 of the Consent; and
- The tenant of any land owned by Gunlake can terminate their tenancy agreement without penalty at any time, subject to giving reasonable notice, to the satisfaction of the Secretary, in accordance with Schedule 3, Condition 17 of the Project Consent.

2.1.1 Background Dust Concentrations

As part of the environmental assessment process for Gunlake Extension Project, the available monitoring data was used to determine background air quality concentrations at the nearest residential receptors. This data forms a component of the compliance assessment and are shown in Table 2.2 below.

Table 2.2 – Background Air Quality Concentrations

Parameter	Concentration
24-hour average PM10	Varies daily
Annual Average PM2.5	6.7 µg/m ³
Annual average PM10	12.5 µg/m ³
Annual average TSP	31.3 µg/m ³
Annual average dust deposition	1.7 g/m ² /month

The above values are considered low in comparison to typical agricultural environments however natural levels can vary dramatically. It is not unusual for elevated dust to occur during drought conditions or high wind events. Natural variability is taken into account when assessing the contribution of the quarry to background dust levels.

2.1.2 EIS Predictions

The Gunlake Extension Project EIS (2016) upgraded the existing dust dispersion model taking into account monitoring data since the commencement of operations in 2010. The EIS predicted that as a result of the development the nearest residential receptors (private and company-owned) would experience increases in ambient dust levels of up to 0.8 g/m²/month dust deposition, up to 16.5 µg/m³ PM₁₀ 24 hour average atmospheric concentration and an increase in average annual atmospheric concentration of up to 2.0 µg/m³.

The reporting of dust monitoring results in the Annual Review will take account of both the assessment criteria, background dust sources and the impact predictions made in the EIS. This will enable an assessment to be made of the adequacy of dust controls and the accuracy of the EIS prediction model.

2.2 Sources of Dust

This AQMP takes into account three dust sources which may be measured as part of the monitoring program. These include background sources, dust generated from land disturbance and dusts generated from material processing and handling. These are described in the following sections.

2.2.1 Background Sources

The Gunlake property is predominantly agricultural land with some areas of native vegetation. Existing dust sources in the locality include the following:

- dust entrainment due to vehicle movements along unsealed and sealed public roads;
- local building and construction activities;
- episodic emissions from local vegetation burning (e.g. grass and bush fires);

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- regional drought conditions or high wind events;
 - Seasonal emissions from household wood burning fires;
 - Local and regional agricultural activities; and
 - petrol and diesel emission from vehicle movements along public roads.

In addition to the above background sources, the following quarrying operations are located within a 15km radius of the quarry and are additional sources of air pollution emissions:

- Holcim Johnniefields Quarry (approximately 1km to the east);
- Holcim Lynwood Quarry (approximately 1.5km to the south);
- Boral Resources Marulan South Limestone Mine and Peppertree Quarry (approximately 10km to the south-southeast); and
- Divall's Earthmoving and Quarry (approximately 12km to the southwest).

The ambient air quality monitoring program has been designed to distinguish other dust sources which can cause increased dust levels being detected. Principally this involves correlation of the dust measurements with prevailing weather conditions and keeping records of regional dust issues such agricultural activities occurring nearby or events such as bushfire and widespread dust storms.

2.2.2 Land Surface Disturbance

Progressive development of the quarry involves disturbance to new areas which create the opportunities for dust generation. These activities include:

- stripping topsoil and overburden by bulldozer;
- front end loader or excavator loading material;
- Transport of topsoil and overburden; and
- Emplacement of material in designated locations.

The principle mechanism for dust generation from these sources is wheel action and wind erosion. The main control mechanism is the application of water, minimisation of disturbance at any one time and rehabilitation of overburden emplacement areas.

2.2.3 Operational Dust Sources

Operational dust sources include:

- Extraction activities including drill and blast and loading of haul trucks;
- Transport of the material to the processing area;
- Crushing, screening and stockpiling;
- Conveyors and transfer points;
- Material loading and transport offsite; and

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- ☐ General on site activities.

The principle mechanism for dust generation is mechanical separation, wind erosion from exposed surfaces, wheel action and blasting. The main control mechanism is the application of water, enclosure of point sources, protection from prevailing wind and surface stabilisation.

2.3 Greenhouse Gas Emissions

In accordance with the National Greenhouse Accounts Factors (NGAF) workbook (DoE, 2014), Gunlake will account for its greenhouse gas emissions in accordance with Scope 1 (direct emissions from fuel combustion by onsite plant and equipment).

As with all bulk materials handling and processing operations, fuel usage is a key economic driver in the profitability of the operation. In accordance with Condition 19, Schedule 3 of the Development Consent, Gunlake will implement all reasonable and feasible measures to reduce the use of diesel fuels which in turn will minimise the release of greenhouse gases from the site. Measures taken will be reported in the Annual Review.

3. Air Quality Monitoring Program

Ambient air quality monitoring is undertaken at the Quarry to evaluate compliance with the impact assessment criteria detailed in Section 2.1. The results obtained from the dispersion modelling for the extension project indicated that the key indicator pollutants for compliance with air quality goals would be dust deposition and PM₁₀. Consequently, the air quality monitoring program consists of the following monitoring:

- ❑ Dust Deposition Monitoring;
- ❑ PM₁₀ Monitoring.

Monitoring is carried out in accordance with the AQMP and Gunlake's Environment Protection Licence with the primary purpose to assess the dust contribution of the operation to the ambient air quality. The location of monitoring sites is provided in **Figure 2**, Appendix A.

Gunlake Quarry is required to demonstrate compliance with the impact assessment criteria outlined in Section 2.1 and in accordance with the Approved Methods for Modelling (NSW EPA, 2005). The impact assessment criteria are designed to maintain ambient air quality that allows for the adequate protection of human health and well-being. In accordance with the development consent, Gunlake will also take into account the dispersion modelling prediction contained in the EIS as a means of determining that the impact predictions are being achieved.

3.1 Dust Deposition Monitoring

Dust deposition gauges (DDGs) are used to monitor deposited matter on a continuous basis. Deposited dust is monitored at three locations in the vicinity of the quarry as shown on Figure 2.

DDGs are exposed for 30 days (+/- 2 days) and are analysed for Insoluble Solids and Ash residue. Equipment and methods comply with AS 3580.10.1-2003 "*Determination of particulates – Deposited Matter – Gravimetric method*". Locations should conform to the requirements of AS 3580.1.1:2007 "*Methods for sampling and analysis of ambient Air - Guide to siting air monitoring equipment*", subject to local site constraints.

3.2 Particulate Matter (PM₁₀) Monitoring

Monitoring of PM₁₀ at Gunlake using a High Volume Air Sampler (HVAS) has been undertaken since December 2014 at receiver R1, to the north east of the Quarry. The development consent required an additional HVAS which is located on the western side of the quarry at R4 as shown on **Figure 2**. Monitoring at this site commenced on 13th July 2018.

Monitoring for PM₁₀ is undertaken in accordance with "AS 3580.9.6-2003 *Particulate Matter - PM₁₀ - high volume sampler with size-selective inlet*", which involves the implementation of a one-day-in-six cycle using a HVAS fitted with size selective inlet for PM₁₀. As with DDG locations, siting of the HVAS is in accordance with AS 3580.1.1:2007.

3.3 Total Suspended Particulates

Condition 14 of Schedule 3 of the Development Consent requires evaluation of a Total Suspended Particulate (TSP) annual criterion ($90 \mu\text{g}/\text{m}^3$, annual average). TSP is calculated from the PM_{10} data using known percentage composition.

3.4 Meteorological Monitoring

An on-site automated weather station is located to the north of the site office and is configured with an alarm notification system to advise when wind speeds exceed 8 m/s, as required by the development consent. Notification of meteorological conditions assist with onsite air quality management strategies and the identification of periods of adverse dispersion conditions.

4. Air Quality Management

This AQMP represents an update to the 2018 AQMP which was prepared following the approval of the Gunlake Extension Project, with the associated development consent allowing for an increased production level and quarry footprint. The basic management principles have not changed since the original AQMP was prepared, however the implementation of the various dust controls have been refined in light of actual monitoring data. This has enabled a more targeted approach to dust minimisation in line with current best practice. The main components of this AQMP have been designed to ensure that:

- The quarry operation meets current best management practice to minimise dust emissions from the quarry.
- The operation meets the dust assessment criteria contained in Table 2.1.
- Dust sources are identified and appropriately controlled;
- There is a suitable meteorological station operating on site for the life of the quarry.
- An effective dust monitoring program is implemented to obtain the necessary data to assess compliance with the stated criteria.
- A mechanism is available for correcting any non-compliance with the assessment criteria.

The details of the proposed management initiatives are described in the following sections.

4.1 Operating Conditions

Table 4.1 details the operating conditions prescribed in the Development Consent and the management measures that have been adopted.

Table 4.1 – Development Consent Operating Conditions - Air Quality

Condition	Requirement	Measures Adopted
15, Schedule 3	The applicant must:	
	(a) Implement best practice management to minimise the dust emission of the development;	Proposed measures conform with current best practice and these will be reviewed on an annual basis to ensure that dust controls continue to meet current best practice.
	(b) Regularly assess meteorological and air quality monitoring data and relocate, modify, and/or stop operations on site to ensure compliance with the air quality criteria in this consent;	A weather station located on site which is used to assess operating conditions and compare with dust deposition data and PM ₁₀ monitoring data on a monthly basis. Increased dust suppression activities as listed in Table 4.2 will occur should elevated short term dust levels be measured.
	(c) Minimise the air quality impacts of the development during adverse meteorological conditions and extraordinary events (see note d under Table 6)	Specific management actions include additional road watering in high wind events
	(d) Monitor and report on compliance with the relevant air quality conditions in this consent; and	All monitoring data is included and discussed in the Annual Review which also results in a review of the dust control measures contained in this AQMP.
(e) Minimise the area of surface disturbance and undertake progressive rehabilitation of the site; To the satisfaction of the Secretary.	Quarry planning dictates that pre-stripping new areas only occurs when necessary to minimise areas of disturbance at any one time. Rehabilitation commences immediately following completion of final landform.	

Further details of dust controls are described in the following sections.

4.2 Dust and Air Quality Management Initiatives

Dust controls are employed at all stages of the quarry operation including prestripping, extraction, haulage, crushing and screening, stockpiling, product loading and dispatch.

Pre-stripping is undertaken as required first commencing with topsoil stripping followed by overburden extraction and emplacement. As this material is often weathered and consisting of fine particles, care is taken to avoid periods of high wind, or abnormally dry conditions where practical. Water trucks are used to control dust on haul roads between the pre-strip area and the final emplacement site. Once final contours are reached the emplacement surface is prepared, top dressed and revegetated to aid in dust control. Topsoil stockpiles are also sown with a cover crop for stabilisation.

The processing plant utilises atomised water dust suppression systems at key points including discharge points, tipping points, and at crusher inputs and discharges. Dust controls during extraction include application of water on internal haul roads and quarry benches as required using a dedicated water cart. Controls of dust emitted through blasting is provided through blast design which minimises the MIC to only that required to break the rock up sufficiently to reclaim.

The water carts and water sprays are used on a continual basis during dry conditions irrespective of wind conditions to minimise dust on haul roads and hardstand areas. The weather station sends wind updates to the quarry manager and is equipped with an alarm system to advise when wind speed is above 8 m/s. This trigger enables the quarry manager to determine if additional controls or dust avoidance activities are necessary.

4.2.1 Dust Control Measures

A summary of the dust mitigation strategy is provided in Table 4.2.

Table 4.2 Dust Mitigation Summary

Dust Source	Dust Management Initiatives
Stripping, transport, and emplacement/stockpiling of topsoil	Minimise clearing ahead of extraction activities Avoid stripping in high wind conditions Revegetation of completed surfaces
Removal, transport and placement of overburden	Water trucks used on haul roads Temporarily cease or relocate activities if excessive dust cannot be controlled
Drilling activities	Dust apron on drill rig Temporarily cease or relocate activities if excessive dust cannot be controlled
Blasting activities	Blast design to minimise fine particles
Face loading	Water truck used on hardstand areas including extraction benches
Hauling raw product on internal haul roads	Water truck Speed limit Temporarily cease or relocate activities if excessive dust cannot be controlled
Conveyors and transfer points	Water sprays
Crushing, screening	Water sprays Enclosure of crusher
Product stockpiles	Located in nominated areas with topographic shielding
Product loading and dispatch	Use of minimal heights when loading Water cart used on hardstand areas Road registered trucks equipped with automatic tarps Use of bypass road avoids residential areas of Marulan
Internal haul roads	Water truck Temporarily cease or relocate activities if excessive dust cannot be controlled
General on site activities	Water truck Weather station equipped with alarm to warn when wind speeds exceed 8 m/s

In addition to the above controls, during adverse meteorological conditions when wind speed exceeds 8m/s or during other extraordinary conditions the Quarry Manager may limit or stop specific activities being undertaken in the Quarry in order to reduce dust emissions. Increased dust suppression activities as listed in Table 4.2 will occur should elevated short term dust levels be measured. The objectives of the dust controls listed above are to reduce the occurrence of visible dust leaving the site.

4.2.2 Dust Management Protocol

In accordance with Condition 16 (e) of the Development Consent, the following protocol has been developed to determine compliance with air quality goals for the Quarry. The criteria relates to 24 hour maximum and annual averages for particulate matter ($50 \mu\text{g}/\text{m}^3$ and $30 \mu\text{g}/\text{m}^3$ respectively, being project contribution plus ambient) and maximum annual average increase in deposited dust of $2 \text{ g}/\text{m}^2/\text{month}$ above background a total maximum of $4 \text{ g}/\text{m}^2/\text{month}$ annual average. Given that the background dust deposition rate has been determined to be $1.7 \text{ g}/\text{m}^2/\text{month}$, the first trigger has been assumed to be $3.7 \text{ g}/\text{m}^2/\text{month}$. These are summarised in Table 4.3.

Table 4.3 Compliance Protocol

Parameter	Monitoring Results	Action
PM ₁₀	Greater than $50 \mu\text{g}/\text{m}^3$ for 24 hour period	Investigate on site sources of dust Identify any external sources of dust which could contribute to short term exceedances. Review regional data for short term events such as bushfire. Investigate local sources of dust such as from agricultural activities. Should the results indicate the elevated readings arise from the quarry activities Gunlake will investigate the cause of the dust exceedance and implement further mitigation measures as described in Section 4.2.3
	Annual average greater than $30 \mu\text{g}/\text{m}^3$	Compare Gunlake results with the three regional EPA PM ₁₀ monitors to determine any overall elevated dust conditions such as drought or abnormally high wind events that may have contributed to a high annual average result regionally. Analyse anomalies in short term data to determine actual annual average from the quarry activities alone.
Deposited Dust	Greater than $3.7 \text{ g}/\text{m}^2/\text{month}$ for any individual gauge for any monitoring event	Compare with results from other Gunlake DDGs and weather data to confirm if the results occurred downwind of the quarry operation. Identify any on site sources of dust that would have caused the exceedance.
	Greater than $4 \text{ g}/\text{m}^2/\text{month}$ for any individual gauge	Compare with results from other Gunlake DDGs and weather data to confirm if the results occurred downwind of the quarry operation

Parameter	Monitoring Results	Action
		Identify any on site sources of dust that would have caused the exceedance
	Annual average greater than 3.7 g/m ² /month at any individual gauge	Determine if Gunlake's contribution exceeds 2 g/m ² /month and report to the DPIE and EPA.
Wind Speed	Alert received for wind greater than 8 m/s	Investigate any visibly excessive dust generated from specific activities within the Quarry and modify activities as necessary. Direct increased usage of water car. Ensure operability of dust suppression systems within the processing plant.

4.2.3 Additional Dust Controls

The management controls that operate at the quarry are sufficient to control dust in accordance with the development consent. As required by the consent, the dust protocol requires additional measures to be implemented should the excessive dust be generated. The primary reasons for additional dust being generated is a failure of an existing control, such as broken sprinkler or extreme wind events. The following additional measures will be implemented when specified under the compliance protocol. These will be conducted in the order presented.

- Identification of the source of excessive dust.
- Correction of any failed dust control measure.
- Increase application of water.
- Cease activity causing excessive dust.

In accordance with Condition 6 of Schedule 5, Gunlake will implement the principles of adaptive management. If an exceedance of the dust criteria is found and the above additional dust controls are implemented, Gunlake will undertake an internal review of the reasons for the exceedance and determine if further remedial measures are required. The Independent Environmental Audit did not identify the need for any further or additional dust controls or management however should monitoring results in future indicate that further controls be required, these will be adopted in an updated AQMP.

5. Communication and Reporting

Effective communication with government agencies, the workforce and the community are important features of the overall Environmental Management Strategy for Gunlake Quarry and therefore a key component of each Environmental Management Plan.

Project reporting requirements are defined in Schedule 5 of the Development Consent.

5.1 Community Consultation

Gunlake management is required keep the local community and relevant agencies informed about the construction, operation and environmental performance of the project. A Community Consultative Committee (CCC) has been formed and issues relating to air quality are discussed in CCC meetings.

5.2 Community Complaints

Gunlake maintains a community complaints register that identifies actions required to resolve community issues. The main phone line is listed in the white pages, the property sign at the main entrance, as well the company website. The complaints register records the following details:

- Complainant name and contact details
- Nature of the complaint (noise, dust, traffic etc)
- Time and date of the complaint
- Specifics of the complaint
- Actions taken to resolve the complaint
- Confirmation that the complaint has been resolved.

In the event that an issue is unresolved, the register will include details of the outstanding issues and any actions that are required. It is recognised that some issues may not have a simple resolution and have resulted in multiple complaints. These form part of the ongoing environmental improvement program for the operation.

5.3 Government Liaison

Gunlake will continue to liaise with relevant government agencies in relation to the ongoing quarry operation.

5.4 Public Access to Information

Gunlake provide updated environmental monitoring data on the company's web page as required by Condition 13 of Schedule 5 of the development consent. Information provided includes dust monitoring data in accordance with the Environment Protection Licence.

5.5 Reporting

Conditions 8, 9 and 10 of Schedule 5 detail the required reporting regime. These include incident reporting, regular reporting of environmental performance and annual reporting.

Gunlake will continue to submit an Annual Review to the Department of Planning, Industry and Environment each year. The Annual Review is also submitted to the Community Consultative Committee and relevant agencies. The contents required for the Annual Review are detailed in Condition 10, Schedule 5 of the development consent.

The Gunlake Quarry Environmental Protection Licence No. 12012 also specifies reporting requirements. In accordance with the Licence, Gunlake submits an Annual Return to the Environment Protection Authority (EPA) no later than 60 days after the anniversary date of the Licence. The anniversary date of the Gunlake Quarry Licence is 13 July and consequently, the Annual Return has to be submitted by 11 September each year.

The Annual Return to the EPA includes a Statement of Compliance and a Monitoring and Complaints Summary. Condition R2 of the Gunlake Quarry Environment Protection Licence also requires Gunlake and its employees to notify the EPA as soon as practicable after they have become aware of an incident causing or threatening material harm to the environment. Notification must be made by telephoning the Environmental Line service on 131 555.

6. Verification and Corrective Action

This AQMP forms a component of the overall Environmental Management System for the Gunlake Quarry. An essential component of the EMS is verification and implementation of corrective actions as required to achieve compliance with the requirements of the Development Consent and Environment Protection Licence.

6.1 Environmental Monitoring

As described in Chapters 3 and 4, air quality management initiatives will be monitored during the quarry life. This monitoring work falls within the overall monitoring program for the site which includes surface and groundwater, noise and blasting, traffic, biodiversity and vegetation. The results of this monitoring are summarised in the Annual Review each year.

Gunlake has developed an air quality monitoring program for the Quarry which includes:

- ❑ Dust deposition monitoring at three locations surrounding the quarry. These longterm data points include two representative points to the south and west of the operation and the nearest residential receptor R1 to the east.
- ❑ PM₁₀ monitoring using two high volume air samplers.
- ❑ Meteorological monitoring data obtained from the weather station located on site to enable wind speed and direction to be determined as relevant to dust emissions.

The location of the existing high volume air sampler at R1 to the east of the quarry was agreed to by the EPA in 2014 and represents monitoring location Point 4 on the EPL. Based on the modelling undertaken for the EIS and the prevailing winds being from the west, this was determined to remain be the most suitable location for monitoring the impact of the quarry on ambient air quality. The second high volume air sampler is located at R4 (to the west of the quarry) provides a good indication of ambient air quality upwind of the quarry, and enables the contribution of the quarry to particulate matter generation to be more accurately estimated, as recommended by the EPA in correspondence relating to the Gunlake Extension Project development application.

6.2 Non-Conformance, Corrective Action and Adaptive Management

Responsibility for identifying non-conformances rests with a number of personnel on site to ensure that any non-conformances are identified as soon as possible. Primary responsibility rests with the Quarry Manager. All non-conformances are reported to the Quarry Manager in the first instance who then directs other key personnel as required.

Corrective actions are implemented as soon as practicable on identification of any non-conformances, and records of such are to be maintained. Corrective actions are to be in line with this AQMP as listed in Table 4.3 and management principles as outlined in Table 4.2 to ensure that appropriate guidelines are met. Corrective actions form part of the adaptive management process where any exceedance of the criteria and/or performance measures has occurred.

6.3 Management Review

In accordance with Condition 4 of Schedule 5 of the Development Consent, this AQMP will be reviewed and if necessary revised within three months of:

- submission of an Annual Review;
- submission of an incident report to DPIE or other relevant agencies;
- submission of an Independent Environmental Audit report;
- approval of any modifications to this consent.

Within four weeks of conducting any such review, Gunlake will advise the DPE of the outcomes of the review, and provide any revised documents to the DPIE for review and approval.

The existing dust controls and management systems were reviewed by the Independent Environmental Audit and no further or additional controls were recommended. Gunlake management however will continually monitor the effectiveness of existing controls and implement any additional measures as considered necessary to meet the required dust emission assessment criteria.

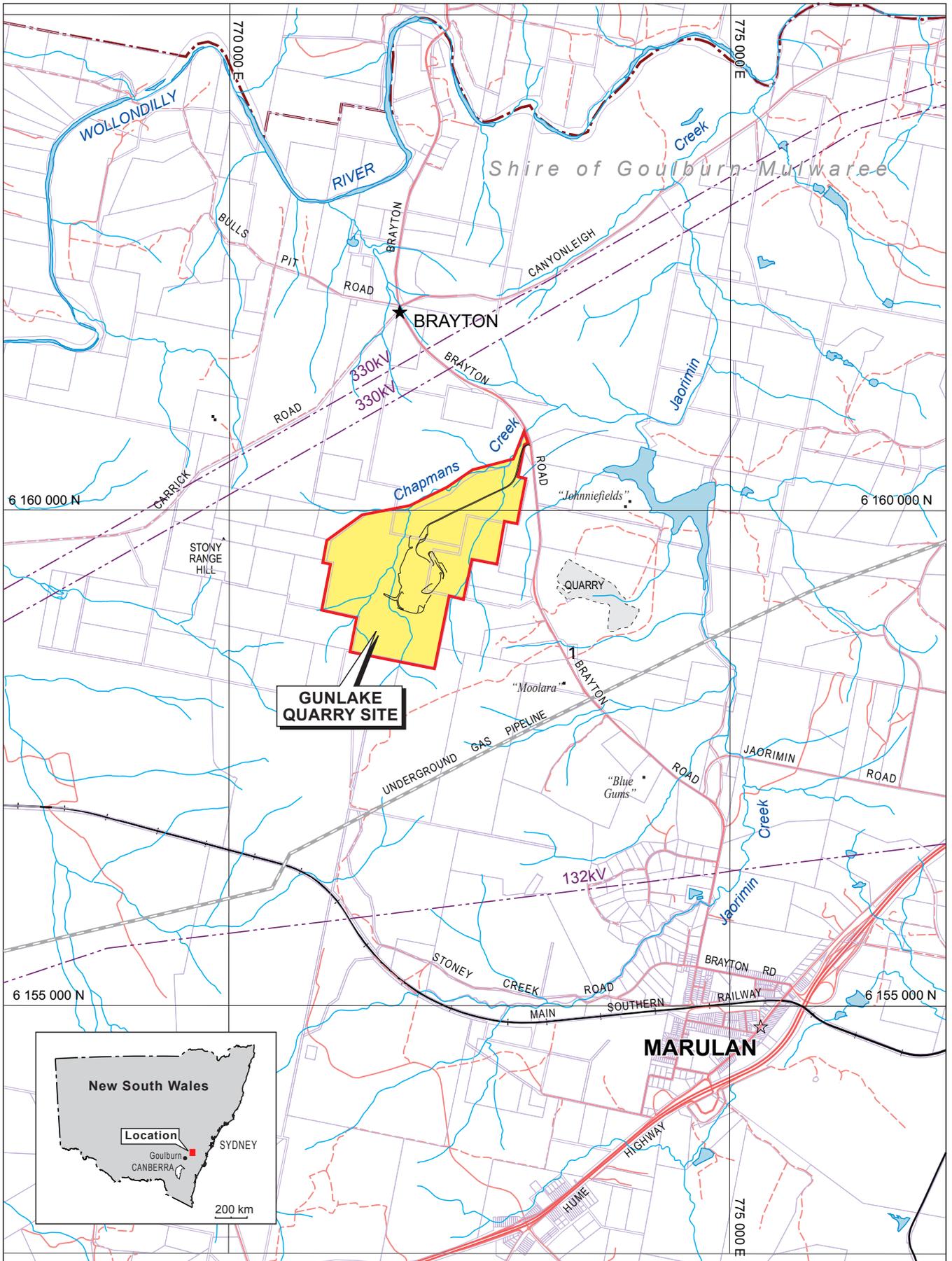
6.4 Continuous Improvements

A key component of the environmental management of Gunlake Quarry is the commitment to continuous improvement. This will be measured by formal and informal criteria. Formal measures will include monitoring data, internal and external inspection and action plans. This information will be used to establish trends in non-compliance and environmental performance. The level of non-compliance with both statutory and company standards will then be summarised in the Annual Review.

6.5 Reporting Procedures

In accordance with Condition 8 of Schedule 5 of the Development Consent, Gunlake will immediately notify the DPIE and EPA of any incident. Within seven days of the date of the incident, Gunlake will provide a detailed report on the incident, and such further reports as may be requested by DPIE and EPA.

Appendix A - Plans



Datum: GDA
MGA Zone 55

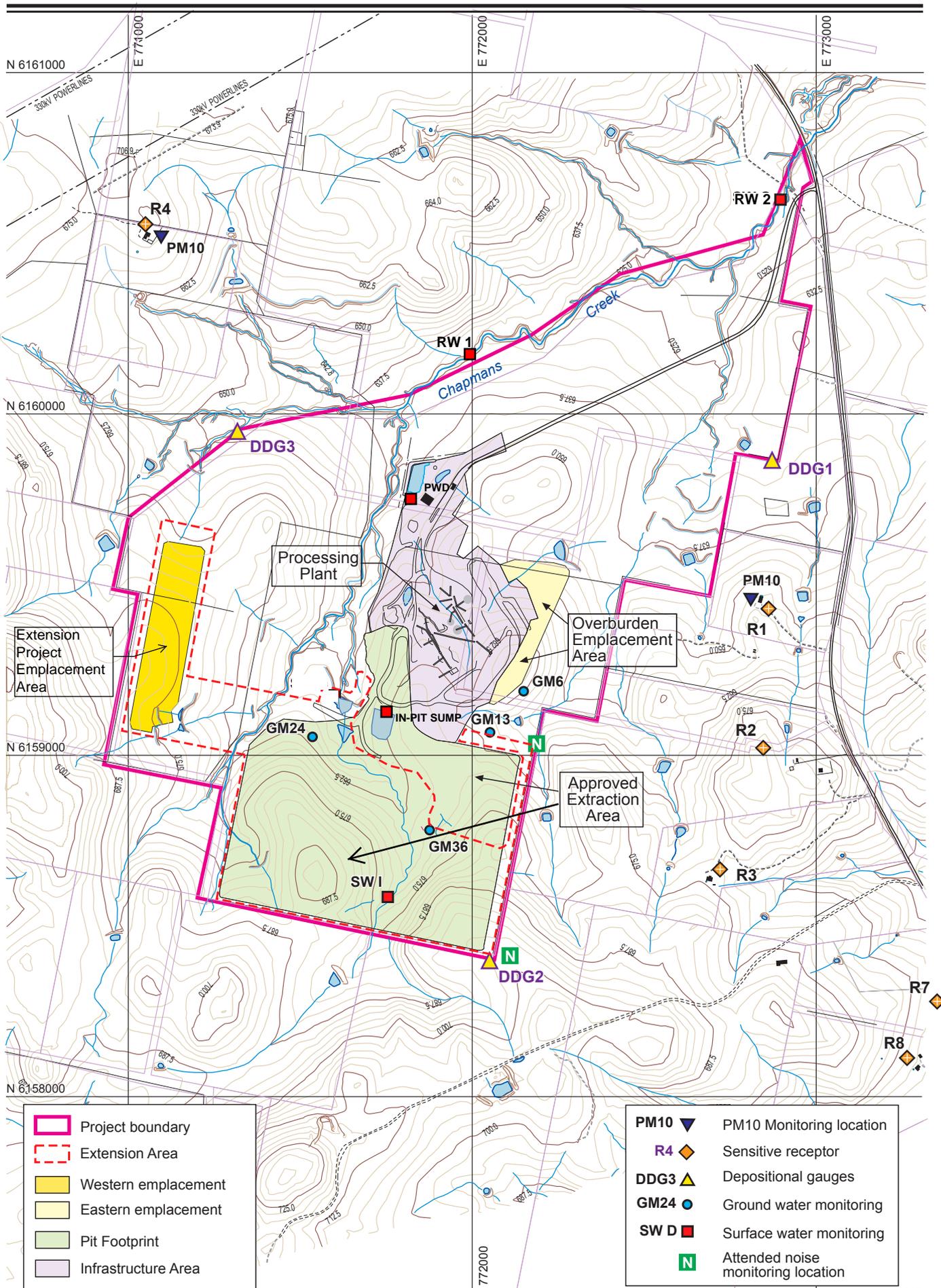
Map Source: © Department of Lands, NSW

- | | | | | | |
|--|----------------|--|--------------------------|--|-----------|
| | Dam | | Gas pipeline | | Main road |
| | River or creek | | Electricity transmission | | Railway |

0 1 2 km



FIGURE 1
Gunlake Quarry
Regional Location



- | | |
|---------------|------------------------------------|
| PM10 ▼ | PM10 Monitoring location |
| R4 ◆ | Sensitive receptor |
| DDG3 ▲ | Depositional gauges |
| GM24 ● | Ground water monitoring |
| SW D ■ | Surface water monitoring |
| N □ | Attended noise monitoring location |

FIGURE 2
Gunlake Quarry
Environmental Monitoring Sites

Appendix B – Stakeholder Consultation

kirsty.nielsen@iec.com.au

From: David Kelly <davidkelly@gunlake.com.au>
Sent: Friday, 6 April 2018 1:55 PM
To: Kirsty Nielsen (kirsty.nielsen@iec.com.au)
Subject: FW: HPE CM: Gunlake Marulan Quarry - Extension Project MP07-0074, SSD7090, LEC 2017/00108663

From: Michael Heinze <Michael.Heinze@epa.nsw.gov.au>
Sent: Thursday, 8 February 2018 9:12 AM
To: David Kelly <davidkelly@gunlake.com.au>
Cc: Stefan Press <Stefan.Press@epa.nsw.gov.au>
Subject: RE: HPE CM: Gunlake Marulan Quarry - Extension Project MP07-0074, SSD7090, LEC 2017/00108663

Good morning David

Thank you for sending those plans through.

It is very unlikely I will have the time to comment on these plans in the time frame you have requested. However, despite the EPA not having an approval role in these plans, I will try and find time to have a look over them in the near future and provide any necessary comment.

Michael

Michael Heinze

Regional Operations Officer – South East Region

South and West Branch, NSW Environment Protection Authority
+61 2 6229 7002 +61 0408 695 070

michael.heinze@epa.nsw.gov.au www.epa.nsw.gov.au @EPA NSW

Report pollution and environmental incidents 131 555 (NSW only) or +61 2 9995 5555



Please send all official electronic correspondence to queanbeyan@epa.nsw.gov.au

Please note that I do not currently work on Wednesdays

From: David Kelly [mailto:davidkelly@gunlake.com.au]
Sent: Friday, 2 February 2018 2:42 PM
To: Michael Heinze <Michael.Heinze@epa.nsw.gov.au>
Subject: HPE CM: Gunlake Marulan Quarry - Extension Project MP07-0074, SSD7090, LEC 2017/00108663

Dear Michael,

Please find attached our draft Soil & Water, Noise & Blast and Air Quality Management Plans for your comment, as required by our consent Ref MP07-0074, SSD7090, LEC 2017/00108663 (copy attached).

These are an update to the site's currently approved plans and take into account the new conditions of consent for the quarry extension project.

Can you please provide your feedback within 2 weeks. If no feedback is received by then we will proceed on the basis that the updated plans have satisfied your requirements.

Thanks & regards,

David Kelly
Head of Development
M: 0437 545732
E: davidkelly@gunlake.com.au



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