Gunlake Quarry Project

Annual Review
1 July 2018 to 30 June 2019

GUNLAKE
QUARRIES

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ANNUAL REVIEW INFORMATION

Name of Operation	Gunlake Quarry
Name of Operator	Gunlake Quarries Pty Ltd
Development Consent No.	2017/108663
Name of holder of Development Consents	Gunlake Quarries Pty Ltd
Annual Review start date	01 Jul 2018
Annual Review end date	30 Jun 2019

1. Introduction

Gunlake Quarry (the Quarry) is a hard rock quarry operated by Gunlake Quarries Pty Ltd (Gunlake) and is located approximately 7 km northwest of Marulan, off the Brayton Road as shown on Figure 1. Gunlake is an independent quarry producer and provides aggregates and manufactured sand for its own operations in Sydney as well as other markets. The defined hard rock resource contains material suitable for use in a full range of quarry products including concrete and sealing aggregates, rail ballast, manufactured sand and road base. The quarry has an expected life of over 100 years and approval under the development consent has been obtained for a 25 year period.

This Annual Review has been prepared in accordance with Schedule 5 Condition 10 of Development Consent 2017/108663 for Gunlake Quarry and covers the operations and environmental monitoring undertaken at Gunlake Quarry for the period 1 July 2018 to 30 June 2019. This Annual Review also outlines the proposed operations for the next reporting period including additional measures that will be implemented to improve the environmental performance of the project. Monitoring locations are shown in Figure 2.

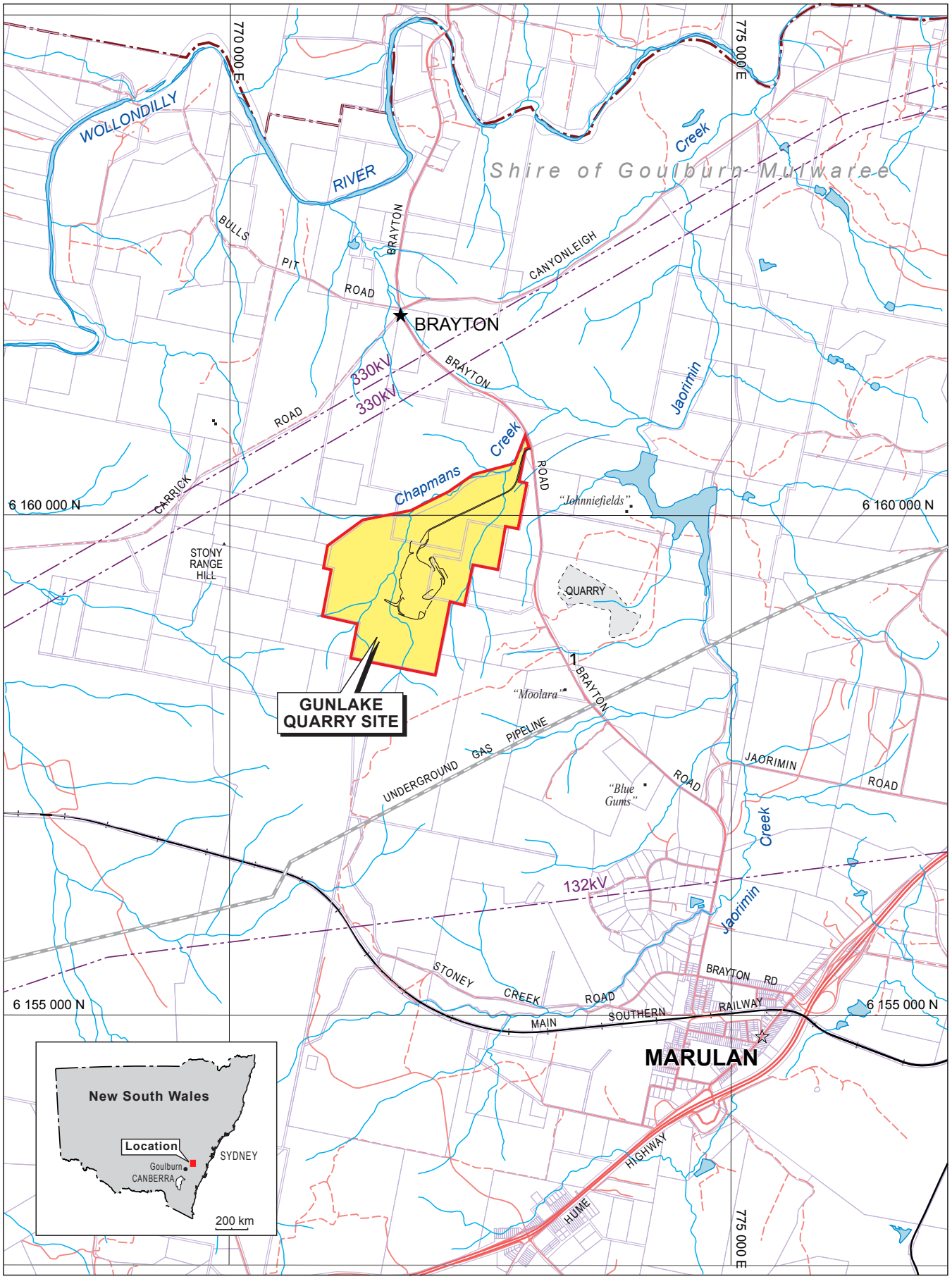


FIGURE 1
Gunlake Quarry
Regional Location

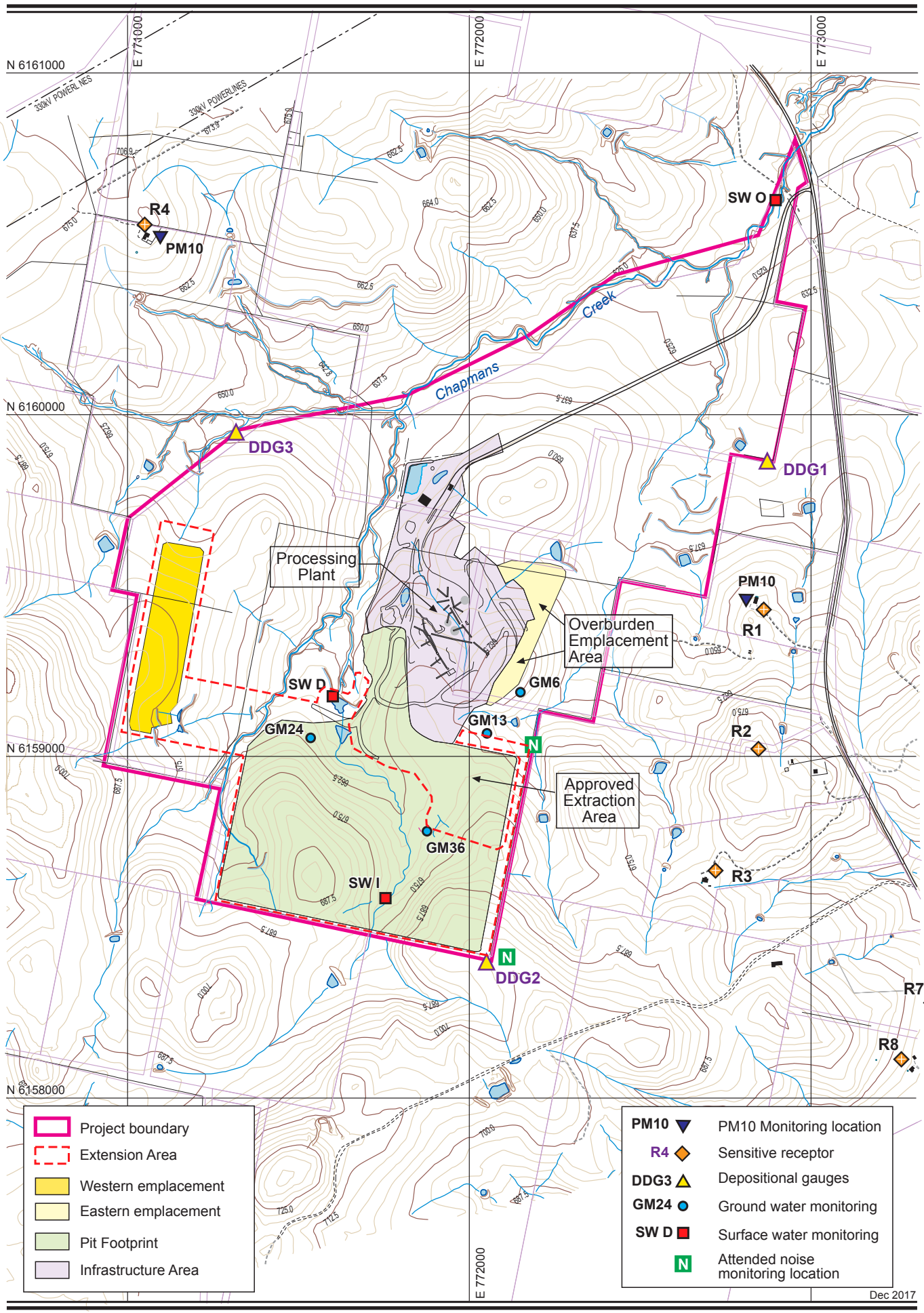


FIGURE 2
Gunlake Quarry
Environmental Monitoring Sites

2. ANNUAL REVIEW REQUIREMENTS

By the end of September each year, or other timing as may be agreed by the Secretary, Gunlake must submit a report to the Department reviewing the environmental performance of the development to the satisfaction of the secretary. This review must:

a) describe the development (including any rehabilitation) that was carried out in the previous financial year, and the development that is proposed to be carried out over the current financial year;
b) include a comprehensive review of the monitoring results and complaints records of the development over the previous financial year, which includes a comparison of these results against the:
    - relevant statutory requirements, limits or performances measures/criteria;
    - requirements of any plan program required under this consent;
    - monitoring results of previous years; and
    - relevant predictions in the documents listed in condition 2(a) of Schedule 2;
c) identify any non-compliance over the past financial 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 development
e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and
f) describe what measures will be implemented over the current financial year to improve the environmental performance of the development.

The Applicant must ensure that copies of the Annual Review are submitted to Council and the EPA and are available to the Community Consultative Committee and any interested person upon request in accordance with condition 7, Schedule 5 of the development consent.

2.1 Key Personnel

Details of the management personnel at Gunlake Quarry are provided in Table 2.1 below. Additional specialist advice is provided as required by a range of environmental consultants.

Table 2.1 –Quarry Contacts

Role	Name	Contact
Quarry Manager	Vince Matthews	02 4841 1344
Project Manager	David Kelly	02 4841 1344
Director	Ed O'Neil	02 4841 1344

3. APPROVALS

3.1 Project Approval

Gunlake Quarry held Project Approval 07_0074 which was surrendered on 6th August 2018.

3.2 Gunlake Extension Project SSD Development Consent 2017/108663

In June 2015 Gunlake submitted the Preliminary Environmental Assessment and request for the Secretary's Environmental Assessment Requirements for the proposed Gunlake Quarry Extension Project. The Secretary's requirements were issued on 13th October 2015. An Environmental Impact Statement (EIS) prepared to support the Development Application and in April 2016 Gunlake submitted the EIS for the Gunlake Quarry Extension Project to the DP&E. This project was subject to assessment under Division 4.1 of Part 4 of the EP &A Act and represents a State Significant development.

The EIS was on exhibition from 4th April to 20th May 2016. A Response to Submission Report was prepared and submitted in September 2016 which responded to submissions received in relation to the EIS and matters raised during ongoing consultation with government agencies and the community, including issues raised at the public meeting convened by DPE on 30th June 2016.

Development Consent for the Gunlake Extension Project was refused by the NSW Planning Assessment Commission in April 2017, with the determination based primarily on community impacts associated with product transportation. This determination was referred to the Land and Environment Court, and approval of the Gunlake Extension Project was granted on 30th June 2017 (Appendix A).

3.2.1 Development Consent Modification

A modification to Development Consent 2017/108663 was lodged with the NSW Land and Environment Court in March 2019. This modification seeks to amend Schedule 3 Condition 32 of the consent that relates to historical biodiversity areas to reduce the required area from 78.82ha to 39.6ha. It does not change the quarry layout or activities. A Statement of Environmental Effects for the proposed modification was prepared for the Department of Planning and Environment (DPE) and placed on public exhibition from 25 April 2019 to 9 May 2019. On 14 May 2019, the DPE requested the preparation of a report detailing responses to the issues raised in the submissions. A response to submissions (RTS) report was prepared in June 2019. It is anticipated that a determination will be handed down in the coming reporting period.

3.3 EPA Environment Protection Licence

The quarry holds Environment Protection Licence 13012 administered by the Environment Protection Authority covering all scheduled activities undertaken at the Quarry (Appendix B). The licence anniversary date for EPL 13012 is 13th July each year. The licence was varied on 12th July 2018 to reflect the requirements of the development consent. The variations covered noise assessment locations and limits, hours of operation, and the requirement for an additional PM_{10} monitor.

3.4 Federal Approval EPBC

Prior to its approval, the Gunlake Extension Project was referred to the Federal Department of the Environment and Energy and it was determined that the project comprised a controlled action with impact to threatened species and communities listed under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The controlled action was subsequently approved under the EPBC Act on 17th November 2017 (EPBC 2015/7557).

3.5 Water Access Licence

Water access licence WAL42340 was issued to Gunlake on 26th April 2019 which allows for 37ML annual extraction from the Goulburn Fractured Rock Groundwater Source in the Greater Metropolitan Region Groundwater Source Water Sharing Plan.

4. OPERATIONS SUMMARY

The following sections provide a summary of the works undertaken at Gunlake Quarry during the period 1st July 2018 to 30th June 2019.

4.1 Quarry Operations

4.1.1 Land Preparation

Within the reporting period, land preparation in the approved Gunlake Extension Project pit and overburden areas commenced. The majority of the vegetation cleared for this purpose during the reporting period was pasture, which was stripped and retained in the topsoil and stockpiled adjacent to the overburden emplacement area for future use. Following soil stripping activities, overburden was removed progressively from the quarry pit area prior to blasting and subsequent resource extraction. Overburden emplacement commenced in the new emplacement area to the northwest of the quarry following soil stripping.

4.1.2 Drilling and Blasting

Drilling and blasting is undertaken by specialist contractor Orica. A hydraulic drill is used to prepare approximately 30,000t of rock material for blasting. A total of 34 blasts occurred during the reporting period. All blasts were fully monitored, and neighbours notified of the blasts as outlined in the Noise and Blast Monitoring Program. Results of the blast monitoring are provided in Section 6.7.

Regular drilling and blasting will continue during the next 12 months as required to prepare quarry rock for removal to the crushing and processing plant. The information collected during blasting already undertaken will continue to be used to assist with the design of the regular blasting activities. The frequency of blasting may increase during the coming reporting period as the Extension Project Development Consent allows for blasting twice per week.

4.1.3 Crushing and Processing

Crushing and processing continued during the reporting period within the processing areas to the north of the quarry pit. A heavy vehicle haul road connects the quarry pit and the processing area, allowing quarried rock to be transported by 50t dump trucks from the extraction area to the primary and secondary crushers and screens. Product is conveyed to the tertiary and quaternary crushers and screens for further crushing, screening and shaping. The processing plant features atomised water dust suppression systems at all of the discharge points, as well as the tipping point into the apron feeder and at the primary crusher input.

A front end loader is used to load various products into road registered trucks for transport to various market destinations. The processing equipment and saleable products stockpiles area acoustically and visually screened by the overburden emplacement bund wall and also by the nature of the existing topography.

Quarrying and processing activities will continue during the coming reporting period. Quarry production in the next reporting period is anticipated to increase from the previous reporting period.

4.1.4 Maintenance and Rehabilitation

Maintenance on plant and equipment is scheduled and carried out on a regular basis. Rehabilitation is undertaken on a progressive basis. During the reporting period rehabilitation activities were associated with maintenance to rehabilitation areas and weed spraying,

4.1.5 Hours of Operation

Table 4.1 Hours of Operation

Activity	Permissible Hours
Construction	7am to 6pm Monday to Friday 8am to 1pm Saturday At no time on Sunday or Public Holidays
Blasting	9am to 5pm Monday to Friday At no time on Saturday, Sunday or Public Holidays
Quarrying Operations (excluding overburden removal/ emplacement and drilling)	24 hours a day but not between 6pm Saturday and 2am Monday At no time on Sunday or Public Holidays
Overburden removal/ emplacement and drilling	7am to 6pm Monday to Saturday At no time on Sunday or Public Holidays
Loading and Dispatching	24 hours a day but not between 6pm Saturday and 2am Monday At no time on Sunday or Public Holidays
Transportation on the primary transport route	24 hours a day but not between 6pm Saturday and 2am Monday At no time on Sunday or Public Holidays
Transportation on the secondary transport route	6am to 7pm Monday to Saturday At no time on Sunday or Public Holidays
Maintenance	At any time provided that the activity is not audible at any privately-owned residence

4.2 Traffic and Transportation

Gunlake Quarry operates under a Traffic Management Plan (TMP) which was updated and approved by the Department of Planning and Environment during the 2017/2018 reporting period. The TMP incorporates the commitments made by Gunlake in the Environmental Assessment and the Development Consent conditions.

In accordance with the TMP, all drivers (both quarry staff and contractors) are made aware of and trained in the requirements of the Plan and the Driver Code of Conduct.

Saleable products are transported by truck from the quarry direct to the Sydney market and to other markets north and south of Marulan. South bound laden trucks use the Brayton Road to access the purpose built and grade separate Hume Highway interchange at Marulan, and trucks returning from the south continue north along the highway past the Marulan interchange and turn left onto Red Hills Road intersection to use Ambrose Road to Brayton Road. Laden trucks heading north use Ambrose road exiting onto the Hume Highway at the Red Hills Road intersection. Trucks returning from the north cannot make a right hand turn from the Highway at Red Hills Road. They travel further south to the South Marulan Interchange on the Highway and use the grade-separated roundabout intersection to U turn and access the northbound lane in the Hume Highway and return to make a left hand turn into Red Hills Road, and then use Red Hills Road, the Bypass Road and Brayton Road back to the Quarry. Trucks returning from the southern customers travel north along the Hume Highway and utilise Red Hills Road, the Bypass Road and Brayton Road.

4.2.1 Product Transport

The majority of the product from the quarry is transported north towards Sydney. Truck movements are limited to no more than 370, including no more than 25 outbound laden movements on the secondary transport route, per working day (averaged over the working days in each calendar month, except for the two-monthly periods of November / December and January / February during which it may be averages over the working days in the relevant two-monthly period) and a maximum of 490m including a maximum of 38 outbound laden truck movements on the secondary transport route, on any working day.

Gunlake has upgraded the Primary Transport Route in accordance with the Austroads design standards, including the addition of the quarry acceleration lane, constructing a new acceleration lane at the junction of Red Hills Road and the Hume Highway to NSW RMS standards, and the incorporation of a wide centre line as shown on Plate 1.

Plate 1 a) Intersection of Red Hills Road and Hume Highway b) Wide centre line on Brayton Road

4.2.2 Council Contributions

Gunlake pays to Council an annual S94 contribution towards maintenance of the Council roads on the Primary and Secondary transport routes.

4.3 Employment

The workforce at Gunlake currently comprises over 42 full time on-site employees and 25 to 38 contract truck drivers (full time equivalent).

4.4 Next Reporting Period

During the coming reporting period quarrying will continue in the current approved extraction area with further bench development as well as pit expansion to the west of the current extraction area. General quarrying operations will continue with:

- pre-stripping of topsoil;
- overburden removal and emplacement;
- drill and blast activities;
- resource extraction and hauling;
- crushing, screening and stockpiling operations; and
- maintenance and rehabilitation activities.

5. ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

This Annual Review represents the first Annual Review as required under development consent 2017/108663 and therefore there are no previous requirement. This will be reported on next year following responses from DPE and EPA to this Annual Review.

6. ENVIRONMENTAL PERFORMANCE

6.1 Environmental Management

Gunlake operates under a series of environmental management plans and monitoring programs to minimise and manage the identified potential environmental impacts associated with the project. These plans include:

- Noise and Blast Management Plan;
- Air Quality Management Plan;
- Soil and Water Management Plan;
- Rehabilitation and Biodiversity Offset Management Plan;
- Aboriginal Heritage Management Plan; and
- Traffic Management Plan.

This section addresses the EIS predictions, performance criteria, operational measures, commitments and management activities that have been defined as relevant for the Gunlake Quarry Extension Project.

The above-mentioned management plans have been updated in accordance with the Gunlake Extension Project SSD Development Consent as required.

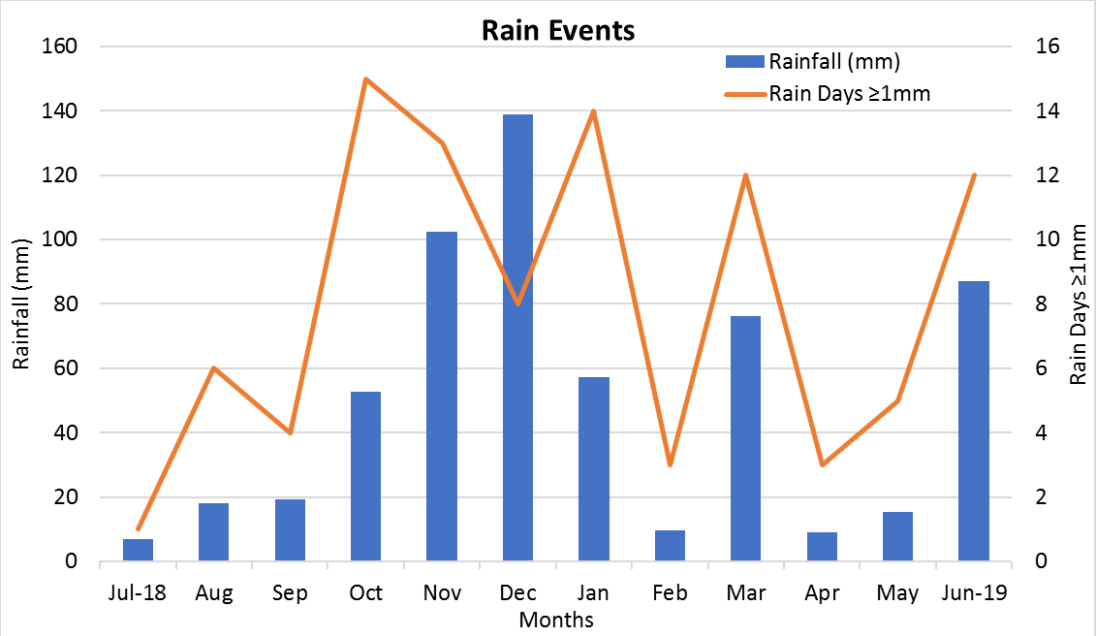
6.2 Meteorological Monitoring

Gunlake Quarry operates a weather station at site in accordance with condition 18 of Schedule 3 of the Development Consent. The station provides data for day to day operations and environmental management.

6.2.1 Rainfall

Table 6.1 – Total Monthly Rainfall (mm) (2018/19)

Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	**Tot**
7	18.2	19.4	52.8	102.4	138.8	57.2	9.6	76.2	9.2	15.4	87	593.2
Number of Rain Days (≥1mm)												
1	6	4	15	13	8	14	3	12	3	5	12	96



Graph 6.1 – Monthly Rainfall and Number of Rain Days

The previous 2017/2018 reporting year experienced close to 60mm greater rainfall than the current period, with rainfall in February 2018 alone reaching 163.6mm. The current 2018/2019 period had 4 more rain days than the previous year.

During this reporting period, the highest rainfall was experienced in December with 138.8mm. Meanwhile, July 2018, February, April and June 2019 all experienced less than 10mm per month. The months with the highest number of rain days were October, January and November, with 15, 14 and 13 days of rain above 1mm respectively.

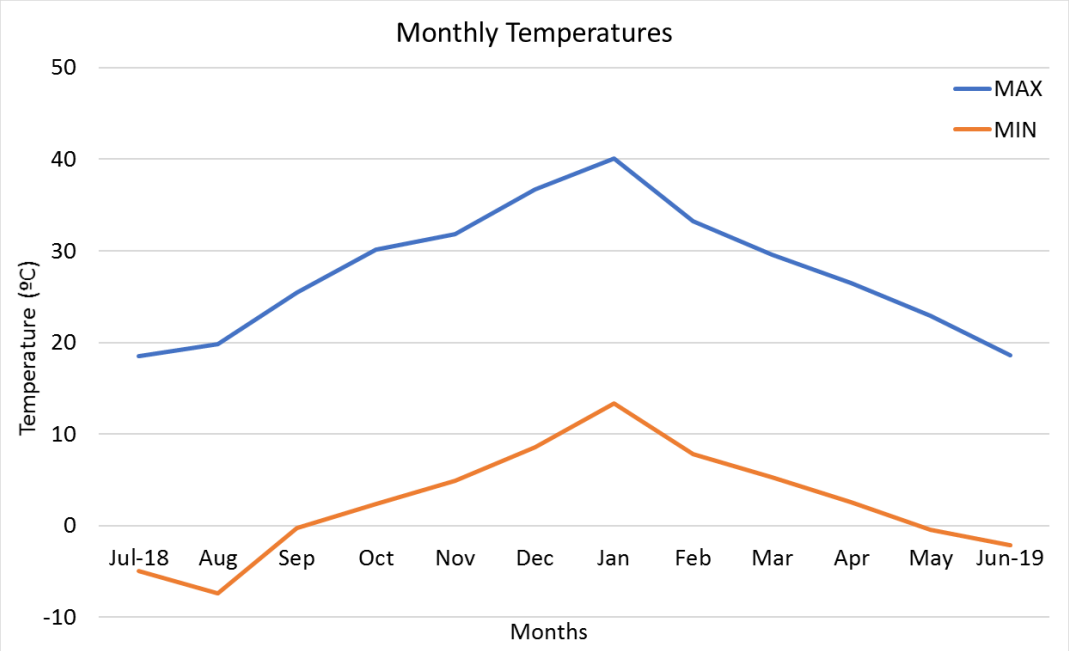
NSW was declared to be in 100% drought during 2018, and was still at significantly high levels of drought throughout 2019. The severity of the drought conditions experienced state-wide are highlighted by the fact that BOM has stated that the present drought is now officially the worst on record in the Murray–Darling Basin.

6.2.2 Temperature

The area is characterised by mild to hot summers and cool to cold winters. Generally, December, January and February are the warmest months with mean daily maximum temperatures approximately 33 to 40°C (Graph 6.2). August was the coldest month with minimum daily temperatures reaching -7.4 °C. Table 6.2 shows temperature for the past reporting period. On average, the 2018/2019 year had lower minimum mean monthly temperatures and higher maximum monthly temperatures than the current reporting period by approximately 6°C.

Table 6.2 - Minimum and Maximum Monthly Temperatures (°C) (2018/19)

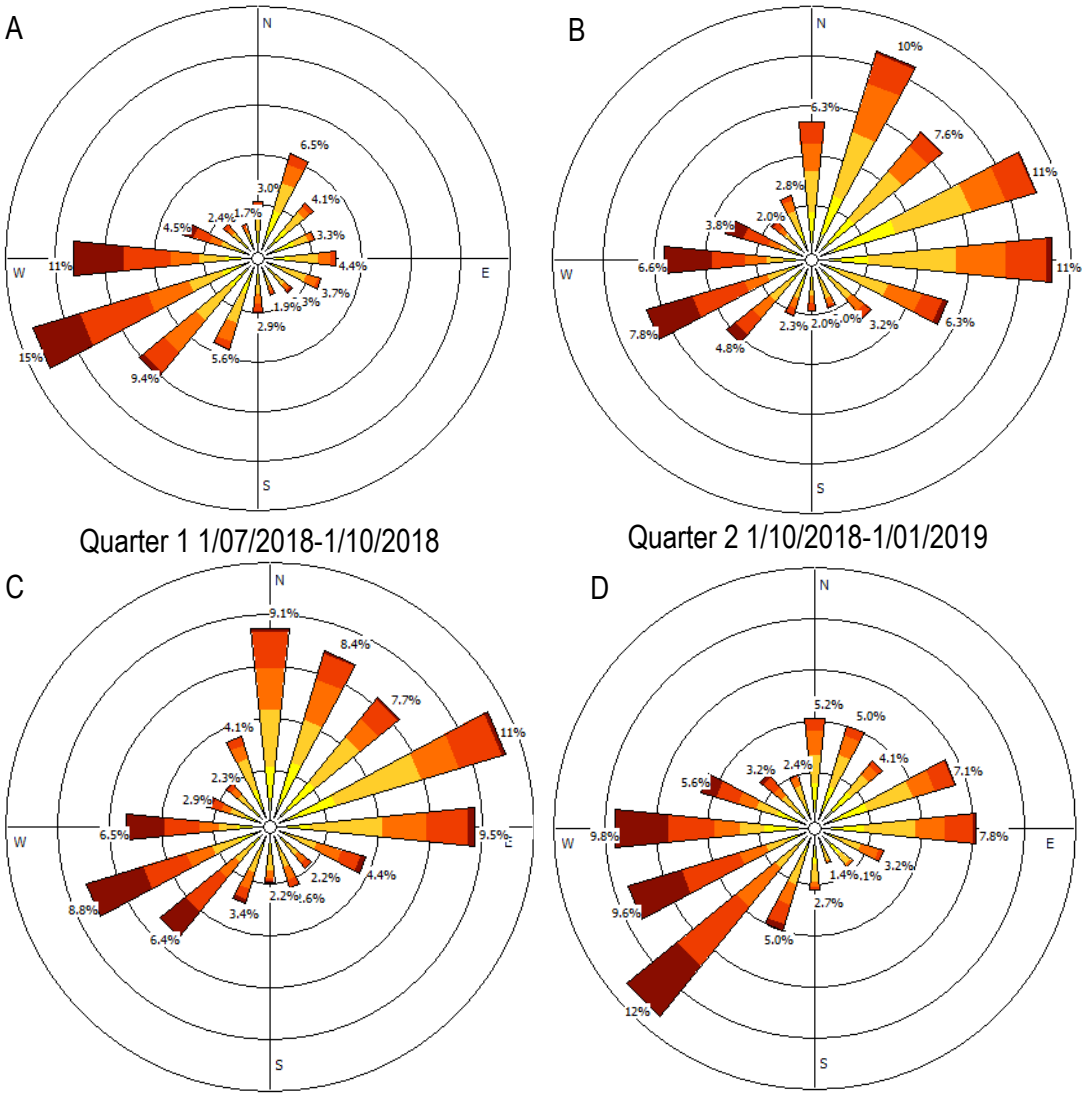
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Min	-4.9	-7.4	-0.3	2.4	4.9	8.6	13.3	7.8	5.3	2.6	-0.4	-2.1
Max	18.5	19.8	25.4	30.1	31.8	36.7	40.1	33.2	29.6	26.5	22.9	18.6



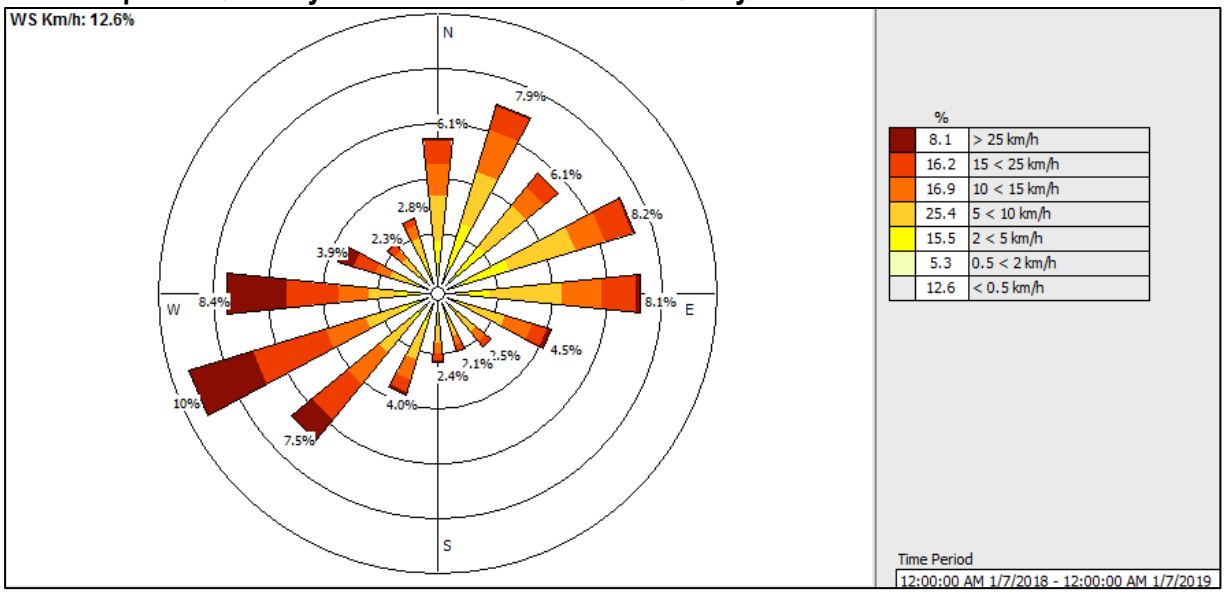
Graph 6.2 – Monthly Minimum and Maximum Temperatures

6.2.3 Wind

Quarterly wind roses and an annual average wind rose showing wind speed and direction data recorded by the Gunlake weather station are shown in Graph 6.3 (A-D) and Graph 6.4 respectively. The annual recorded wind pattern consists of strong, high speed west-southwest to westerly winds throughout the entire reporting period, however lower speed air flow is predominant from the east-northeast during spring and summer months (Graph 6.3 B, C). The long term average recorded wind speed is 3.5 m/s, and calm conditions remain similar to the previous year with a frequency of (wind speeds less than 0.5 m/s) 12.6% of the time (Graph 6.4).



Graph 6.3 Quarterly Wind Roses from Gunlake Quarry Station 2018/19



Graph 6.4 Annual Average Wind Rose Gunlake Quarry Station 2018/19

6.3 Air Quality

Gunlake Quarry operates under an approved Air Quality Management Plan (AQMP), which documents the control measures and management initiatives to control dust generation from the site.

The main objectives of the AQMP are to provide a program detailing the assessment criteria, monitoring locations and procedures, reporting protocol and compliance checking procedures for air quality management at the Quarry.

There are three broad dust sources which may be measured as part of the monitoring program, which are:

- Background sources such as from traffic on unsealed local roads and agricultural activities,
- Dust generated from land disturbance such as topsoil stripping and overburden emplacement; and
- Dust generated from material processing and handling, such as crushing, screening and conveying product.

6.3.1 Dust Control Measures

A summary of the dust mitigation strategy is provided in Table 6.3. In addition to the below controls, during adverse meteorological conditions when wind speed exceeds 8m/s the Quarry Manager may limit or stop specific activities being undertaken in the Quarry in order to reduce dust emissions. During the reporting period the haul roads were upgraded with further compaction and a second water cart was purchased to enable more effective dust reduction during adverse weather conditions.

Table 6.3 - Air Quality and Dust Management Measures

Activity	Control
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 cart used on haul roads
Drilling activities	Dust apron on drill rig
Blasting activities	Blast design to minimise fine particles
Face loading	Water cart used on hardstand areas and extraction benches
Hauling raw product on internal haul roads	Water truck Speed limit
Conveyors and transfer points	Water sprays
Crushing, screening	Water sprays
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

Activity	Control
Internal haul roads	Water truck
General on-site activities	Water truck Alarm on weather station when wind speeds exceed 8 m/s

6.3.2 Air Quality Monitoring Program

The Gunlake AQMP contains assessment criteria, reporting protocol and compliance checking procedures and monitoring program to enhance the management of any potential air quality impacts associated with the Project. In addition to the assessment criteria, Gunlake have made specific commitments and the Development Consent contains a number of conditions aimed at minimising air quality impacts

The air quality monitoring program comprises the following:

- Three dust deposition gauges located to the northeast, south and northwest of the quarry operations as shown on Figure 2;
- Two high volume air samplers located at R1 to the east of the quarry and R4 located to the northwest of the quarry; and
- Automatic weather station located adjacent to the site offices.

The air quality monitoring activities are summarised in Table 6.4 below.

Table 6.4 –Air Quality Monitoring Program

Monitoring Site	Parameter	Timing
DDG1	Deposited Dust	Monthly (30 days +/- 2 days)
DDG2	Deposited Dust	Monthly (30 days +/- 2 days)
DDG3	Deposited Dust	Monthly (30 days +/- 2 days)
R1 (HVAS)	Particulate Matter (PM_{10})	One day in six cycle
R4 (HVAS)	Particulate Matter (PM_{10})	One day in six cycle
Weather Station	Meteorological Parameters	Continuous

6.3.3 Background Dust Concentrations

As part of the Environmental Assessment process for Modification 2, the available monitoring data was used to determine background air quality concentrations at the nearest residential receptors. These are shown in Table 6.5 below and are considered low in comparison to typical agricultural environments.

Table 6.5 – Background Air Quality Concentrations

Parameter	Concentration
24-hour average PM_{10}	Varies daily
Annual Average $PM_{2.5}$	7 ug/m^3
Annual average PM_{10}	13 ug/m^3
Annual average TSP	33 ug/m^3
Combined Annual Average Dust Deposition	1.8 g/m^2/month

6.3.4 Air Quality Assessment Criteria and Predictions

Table 6.6 defines the short term and long term impact assessment criteria for particulate matter and Table 6.7 defines the long term impact assessment criteria for deposited dust.

Table 6.6 Short Term and Long Term Particulate Matter Impact Assessment Criteria

Pollutant	Averaging Period	[d] Criterion
Total Suspended Particulate matter (TSP)	Annual	[a] 90 ug/m3
Particulate Matter < 10um (PM_{10})	Annual	[a] 30 ug/m3
	24 Hour	[a] 50 ug/m3

Table 6.7 Long term Assessment Criteria for Deposited Dust

Pollutant	Averaging Period	Maximum Increase in Deposited Dust Level	Maximum Total Deposited Dust Level
[c] Deposited dust	Annual	[b] 2g/m^2/month	[a] 4g/m^2/month

Notes to Tables 6.6 and 6.7:

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) 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; and

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 in consultation with EPA.

The data presented in Table 6.8 below shows the predicted Gunlake Quarry- only incremental concentrations and deposition rates at each of the receptor locations. The following EIS predictions are under an existing operations scenario. All concentrations and deposition rates are well below the relevant impact assessment criteria, as presented in Tables 6.6 and 6.7 above.

Table 6.8 Predicted Quarry-only Incremental Concentrations and Deposition Rates for Existing Operations

Receptor ID	Annual TSP (µg/m^3)	Max 24h PM_{10} (µg/m^3)	Annual PM_{10} (µg/m^3)	Max 24h $PM_{2.5}$ (µg/m^3)	Annual $PM_{2.5}$ (µg/m^3)	Annual RCS	Annual Dust Deposition (g/m^2/month)
Criteria	90	50	30	25	8	3	2
1*	2.4	9.7	0.9	1.5	0.2	0.013	0.4
2	1.0	6.7	0.4	1.1	0.1	0.005	0.2
3*	0.5	3.3	0.2	0.7	<0.1	0.003	0.1
4*	0.2	1.4	0.1	0.3	<0.1	0.001	<0.1
5	0.9	4.9	0.3	0.8	0.1	0.004	0.1
6	0.5	1.4	0.1	0.2	<0.1	0.002	0.1
7	0.3	1.2	0.1	0.2	<0.1	0.001	<0.1
8	0.7	1.3	0.1	0.2	<0.1	0.002	0.1
9	0.3	0.7	0.1	0.1	<0.1	0.001	<0.1
10	0.2	0.6	0.1	0.1	<0.1	0.001	<0.1
11	0.1	0.5	<0.1	0.1	<0.1	0.001	<0.1
12	0.1	0.5	<0.1	0.1	<0.1	0.001	<0.1

**Gunlake Quarries owned residence*

6.3.5 Dust Deposition Monitoring Results

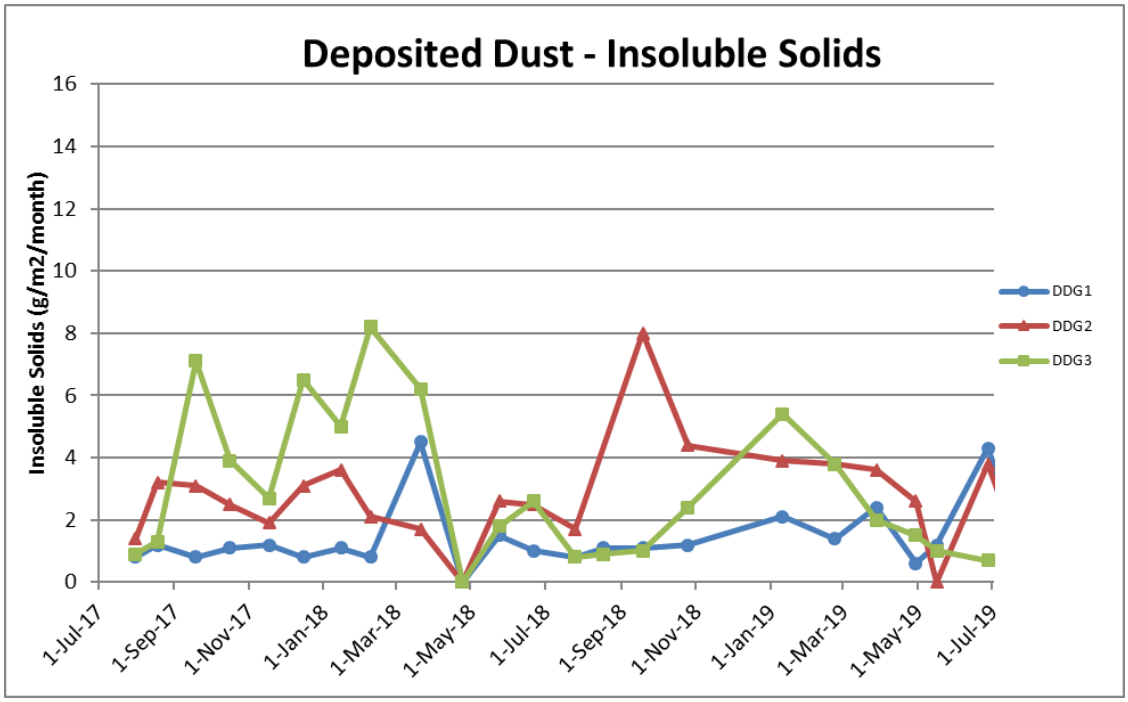
Table 6.9 includes the dust fallout data for the reporting period which is shown graphically in Graph 6.5. Dust deposition levels are monitored by Gunlake at three locations in the vicinity of the quarry. Dust Deposition Gauge 1 (DDG1) is located to the northeast of the quarry, DDG2 to the south and DDG3 to the northeast. Monitoring has been undertaken on a monthly basis continually since 2007 and the locations of the monitoring sites are shown on Figure 2.

The Gunlake property is predominantly grassland with patches of well vegetated areas with tall trees. Sources of particulate matter in the area would include quarrying activities, traffic on unsealed roads, local building and construction activities, and agricultural activities.

Table 6.9 Dust Monitoring Results – Insoluble Solids (g/m²/month)

Date Sampled	DDG1	DDG2	DDG3
25-Jul-18	0.8	1.7	0.8
17-Aug-18	1.1	N/A#	0.9
18-Sep-18	1.1	8#1	1
25-Oct-18	1.2	4.4#2	2.4
22-Nov-18	N/A#3	N/A#3	N/A#3
12-Dec-18	N/A#4	N/A#4	N/A#4
10-Jan-19	2.1	3.9	5.4
22-Feb-19	1.4	3.8	3.8
28-Mar-19	2.4	3.6	2.0
29-Apr-19	0.6	2.6	1.5
16-May-19	1.2	3.4	1
27-Jun-19	4.3	3.8	0.7

Broken funnel – sample compromised
#1 Pre-stripping of topsoil in pit extension caused localised dust. DDG2 located adjacent to new extraction area.
#2 Removal of overburden in pit extension caused localised dust. DDG2 located adjacent to new extraction area
#3 Extraordinary event - widespread dust storms 2/11/18
#4 Extraordinary event - widespread dust storms 22/11/18



Graph 6.5 - Dust Deposition over the last two Reporting Periods

Table 6.10 Insoluble Solids (g/m²/month) Summary

	Dust Gauge No 1	Dust Gauge No 2	Dust Gauge No 3
Individual Gauge Background Average	1.8	0.9	2.4
Overall Background Average	1.8		
Individual Gauge Average July 17 – June 18	1.4	2.6	4.7
Overall Average for Period July 17 – June 18	2.9		
Individual Gauge Average July 18 – June 19	1.6	3.3	2.1
Overall Average for Period July 18 – June 19	2.3		

The annual average dust deposition at DDG1 for the reporting period was 1.6 g/m²/month, which is lower than the background levels and slightly higher than the previous reporting period. It is still, however, below the assessment criteria detailed in the AQMP. DDG1 had the lowest annual average dust deposition for the reporting period.

The annual average of DDG2 (3.3 g/m²/month) was higher than the background levels for that site and higher than the previous reporting period. It is still, however also well below the assessment criteria detailed in the AQMP. DDG2 is located in proximity to the Gunlake Extension Project extraction area and the increased dust deposition is likely due to localised dust generated from topsoil stripping and overburden removal activities.

The annual average of DDG3 for the reporting period was lower than the background average (2.1 g/m²/month) and was also lower than the previous reporting period as can be seen in Table 6.10

Table 6.11 below shows annual summaries of the dust deposition monitoring program covering background conditions, construction, first production and normal operations.

Table 6.11 Gunlake Quarry Dust Deposition Summary Calendar Year

Year	DDG1	DDG2	DDG3	Average	Comment
2007	0.7	1.3	2.4	1.5	No quarry activities
2008	1.4	2.7	2.4	2.1	No quarry activities
2009	0.9	1.4	2.5	1.6	Construction and initial extraction
2010	1.0	0.9	1.2	1.0	First production
2011	1.5	1.3	3.2	2.0	Normal operations
2012	1.7	1.4	2.3	1.8	Normal operations
2013	2.0	1.1	2.8	2.1	Normal operations
2014	2.1	0.9	2.4	1.8	Normal operations
2015	2.9	1.6	2.5	2.3	Normal operations
2016	1.2	1.2	1.5	1.3	Normal operations
2017	1.3	1.9	4.0	2.4	Normal operations
2018	1.5	3.3	3.2	2.4	Normal operations
Average	1.5	1.6	2.5	1.9	Normal operations

Based on the above results, there are no statistically significant changes in dust deposition rates in the direction of the nearest residential receptors since the quarry commenced operations. DDG3 located to the west of the quarry, has had consistently high readings and is

influenced by normal agricultural activities. DDG1, located to the northeast of the quarry operations, in opposing the direction of the prevailing winds, captures dust emanating from the quarry. This gauge show constant readings from before the quarry started and throughout the operations to date and therefore verify that the dust mitigation strategy has been effective in meeting the assessment goals contained in AQMP, that is the quarry has not increased ambient dust levels by more than 2 g/m^2/month at nearby residential receptors.

6.3.6 High Volume Air Sampling PM10 Monitoring

Gunlake Quarry is required to monitor the very small fraction of total suspended particulate matter, namely the 10 micron fraction (PM_{10}). This test measures the levels of the very fine dust suspended in the air which is a measure of potential health effects (irritation of the respiratory tract) as the small particles can penetrate into the airways and the lungs. Fine dust can persist in the atmosphere for days or even months before it settles and can travel some distance.

PM_{10} monitoring commenced in December 2014 at site R1-HVAS which is located to the northeast of the quarry. PM_{10} monitoring has been expanded with the addition of a second PM_{10} monitor at R4 in mid July 2018, with monitoring at both stations increased to a one-in-six-day cycle in line with the Gunlake Extension Project Development Consent and the EPL variation of 12th July. Results for the 2018/2019 reporting period are contained in Table 6.12 and shown graphically in Graph 6.6 for R1 and R4.

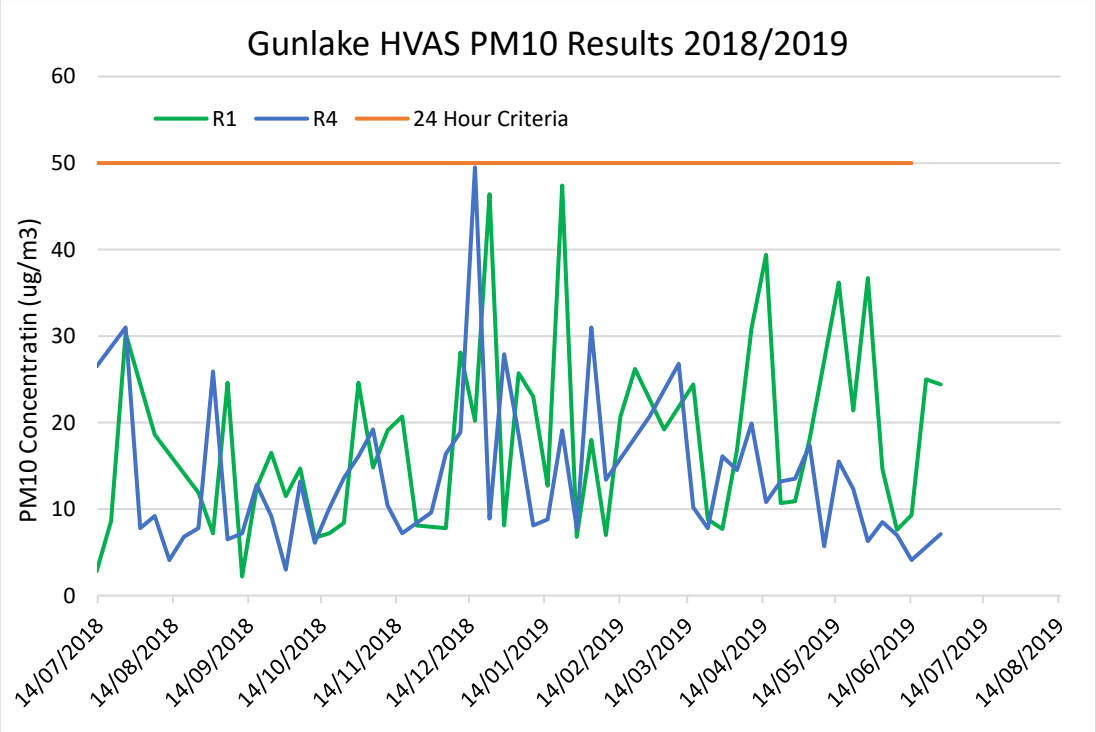
Table 6.12 PM_{10} Monitoring Results

Sampling Date	R1 PM_{10} (µg/m^3)	R4 PM_{10} (µg/m^3)
1/07/2018	2.8	N/A
7/07/2018	8.6	26.5
17/07/2018	30.3	N/A*
24/07/2018	N/A*	31
31/07/2018	18.6	7.8
6/08/2018	N/A*	9.2
12/08/2018	N/A*	4.1
18/08/2018	11.9	6.8
24/08/2018	7.2	7.8
30/08/2018	24.6	25.9
5/09/2018	2.2	6.5
11/09/2018	12.5	7.2
17/09/2018	16.5	12.8
23/09/2018	11.5	9.2
29/09/2018	14.7	3.0*
5/10/2018	6.7	13.2
11/10/2018	7.2	6.1
17/10/2018	8.4	10.1
23/10/2018	24.6	13.6
29/10/2018	14.8	16.1
4/11/2018	19.1	19.2
10/11/2018	20.7	10.4
16/11/2018	8.1	7.2
22/11/2018	71.4#	69#

Sampling Date	R1 PM_{10} (µg/m^3)	R4 PM_{10} (µg/m^3)
28/11/2018	7.8	9.6
4/12/2018	28.1	16.4
10/12/2018	20.2	18.9
16/12/2018	46.4	49.5
22/12/2018	8.1	8.9
28/12/2018	25.7	27.9
3/01/2019	23	18.6
9/01/2019	12.7	8.1
15/01/2019	47.4	8.8
21/01/2019	6.8	19.1
27/01/2019	18.0	7.8
2/02/2019	7.0	31.0
8/02/2019	20.7	13.4
14/02/2019	26.2	64.9# 1
20/02/2019	N/A*	N/A*
26/02/2019	19.2	20.7
4/03/2019	N/A*	N/A*
10/03/2019	24.4	26.8
16/03/2019	8.8	10.2
22/03/2019	7.7	7.8
28/03/2019	16.8	16.1
3/04/2019	30.9	14.5
9/04/2019	39.4	19.9
15/04/2019	10.7	10.8
21/04/2019	10.9	13.2
27/04/2019	18.1	13.5
3/05/2019	N/A*	17.4
9/05/2019	36.2	5.7
15/05/2019	21.4	15.5
21/05/2019	36.7	12.3
27/05/2019	14.6	6.3
2/06/2019	7.6	8.5
8/06/2019	9.3	7
14/06/2019	25	4.1
20/06/2019	24.4	5.6
26/06/2019	2.9	7.1

*Filter paper damaged.
Extraordinary event – widespread dust storm on day of sampling
#1 High reading at background monitoring site R4 not attributable to quarry – prevailing winds from the N to NNE on day of sampling and quarry located to the SE of R4. Corresponding levels at R1 on day of sampling 26.2 µg/m^3.

Graph 6.6 shows the PM_{10} data for both HVAS sites recorded from the 2018/2019 reporting period. The extraordinary events such as widespread dust storms as listed above have been excluded from Graph 6.6 and Table 6.13 below.



Graph 6.6 - R1 and R4 HVAS PM_{10} Results

The results summarised in Table 6.13 show that the PM_{10} results for Gunlake are below the criteria, as detailed in Table 6.6. At R1, the annual average PM_{10} Concentration is 17.62 ug/m^3, with a maximum 24 hour average of 47.4 ug/m^3 and a minimum 24 hour average of 2.2 ug/m^3. At R4, the annual average PM_{10} Concentration is 13.61 ug/m^3, with a maximum 24 hour average of 49.5 ug/m^3 and a minimum 24 hour average of 2.7 ug/m^3.

Table 6.13 PM_{10} Monitoring Summary

	Maximum 24 hour average ug/m^3	**Annual average ug/m^3**
Background	Varies Daily	13
2014/2015	24.9	13.19
2015/2016	40.4	15.33
2016/2017	44.7	18.8
2017/2018	48.0	18.6
2018/2019 R1	47.4	17.62
2018/2019 R4	49.5	13.61
Assessment Criteria	50	30

It can be seen in Table 6.13 that the 24 hour average at R1 was slightly lower than the previous reporting period and below the criteria and therefore in compliance. The maximum 24 hour average at R4 was just below the assessment criteria and the annual average was well below the assessment criteria. Dust assessment contained in the EA predicted that the closest non-company owned residences will not experience dust levels attributed to the project greater than the project emissions criteria as outlined in the AQMP. The monitoring results show that this is the case and the quarry is in compliance.

6.3.7 TSP Monitoring

Condition 14 of Schedule 3 of the Development Consent requires evaluation of a Total Suspended Particulate (TSP) annual criterion (90 µg/m^3, annual average). The typical percentage of PM_{10} in a semi-rural environment (i.e. one where the airshed is not dominated by particulate from motor vehicles) lies in the range of 40-50%. Given this, compliance with the annual PM_{10} criterion (30 µg/m^3) should therefore be seen to satisfying the annual TSP criterion. Monitoring of PM_{10} therefore is used as a surrogate for evaluating compliance with the TSP criterion (i.e. if the annual PM_{10} criterion is satisfied, it is assumed that the TSP criterion will also be achieved). In addition, the annual average TSP has been estimated from the monitoring results to be approximately 33 µg/m^3 which is well below the annual average criteria of 90 µg/m^3 for TSP. These results are in line with the predictions in the EA.

6.4 Biodiversity

6.4.1 Flora and Fauna

The property in which the Gunlake quarry is located was previously extensively cleared and used for sheep and cattle grazing. The property consists of approximately 9.3 ha of highly disturbed native vegetation, of which most is predominantly native pasture in cleared areas and the remainder consisting of clusters of remnant native trees and shrubs and some isolated native trees.

One threatened ecological community has been identified in the vicinity of the quarry that is listed both under the NSW Biodiversity Conservation Act (*as* EEC *White Box Yellow Box Blakely's Red Gum Woodland)* and the Commonwealth EPBC Act (as CEEC *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland*).

During surveys undertaken as part of the original EIS for the Gunlake Extension Project, six threatened fauna species listed under the Biodiversity Conservation Act were recorded within the extension area being the Speckled Warbler, Diamond Firetail (*Stagonopleura guttata*), Square-tailed Kite (*Lophoictinia isura*), Eastern Bentwing Bat, Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) and Little Bentwing Bat (*Miniopterus australis*). Fauna and flora are managed as per Gunlake's Rehabilitation and Biodiversity Offset Management Plan.

6.4.2 Fauna Management

Effective management of vegetation communities at Gunlake enhances the habitat for native fauna species including known rare endangered species such as the Speckled Warbler. Specific management initiatives include:

- Minimising clearing at any one time as the quarry progresses;
- Undertaking pre-clearing surveys which include marking of hollow bearing trees which will not be felled if there is a risk to fauna or active nests;
- A total of two nest boxes per hollow tree removed will be established;
- Should any threatened fauna be discovered or injured a suitably qualified carer such as WIRES will be contacted and works in that area will cease until the ecologist has given the all clear to proceed;

The above measures are designed to minimise the impact on existing fauna on site as well as enhancing the habitat value of the property both during and after quarry extraction.

6.4.3 Biodiversity and Rehabilitation

The aims of the Management Strategy for biodiversity, rehabilitation and agriculture, comprise:

- protection, maintenance and enhancement of 32.66 ha of "Box Gum Woodland" in Biodiversity Areas 1 and 2 through assisted regeneration;
- regeneration and/or replanting of 46.16 ha of cleared land in Biodiversity Areas 1 and 2 with native vegetation representative of Box Gum Woodland;
- retiring 571 ecosystem credits for PCT 1330 in the Gunlake Quarry Extension Project offset areas;
- retiring 845 ecosystem credits for PCT 734 in the Gunlake Quarry Extension Project offsets;
- protection of the biodiversity offsets into perpetuity; and
- no net loss of stream length and aquatic habitat in the offset areas.

The Biodiversity Areas are currently subject to a modification as detailed in Section 3.2.1 which once approved will reduce the total area from 78.82ha to 39.6ha. These areas will remain protected under a conservation agreement and managed in accordance with the Biodiversity, Rehabilitation and Offset Management Plan. The Gunlake Extension Project Offset Areas that house the credits will be protected by the BioBanking Agreement. This agreement was signed at the end of the reporting period and management initiatives of these area will be implemented in the coming reporting period.

The update to the Rehabilitation and Biodiversity Offset Management Plan will be finalised with the resolution of the modification in the coming reporting period.

Plate 3 Biodiversity Conservation Area Rehabilitation Monitoring Site

Plate 4 Biodiversity Conservation Area Existing Vegetation

Plate 5 Gunlake Extension Project Offset Area

6.4.4 Weeds and feral Animals

Two noxious weeds listed under the Goulburn-Mulwaree LGA occur on the Gunlake property:

- Serrated Tussock – *Nasella trichomotoma*
- Blackberry – *Rubus fruiticosus*

Gunlake implements a weed control strategy using a qualified weed control contractor. The weed control program at Gunlake will continue during the coming reporting period, with particular focus in the biodiversity offset areas and riparian zones.

6.5 Operational Noise

The Noise Monitoring Program (NMP) and Blast Monitoring Program (BMP) are contained in the Noise and Blast Management Plan (NBMP) for Gunlake Quarry, and detail the monitoring locations, methods of monitoring noise and vibration and the correct compliance checking procedures for the subsequent reporting in accordance with the Department of Planning and Environment (DPE) and the EPA requirements.

Table 6.14 lists the Gunlake Quarry Project operational noise assessment criteria as prescribed in Condition 6, Schedule 3 of the Development Consent. These criteria have to be met at any residence or on more than 25% of any privately owned land.

Table 6.14 Operational Noise Assessment Criteria

Noise Assessment Location	Day	Evening	Night	
	L_{Aeq} (15 minute)	L_{Aeq} (15 minute)	L_{Aeq} (15 minute)	L_{A1} (1 minute)
R7	38	38	38	45
R8	37	37	37	45
All other privately-owned residences	35	35	35	45

Noise modelling for the EIS identified receiver locations R7 and R8 as being relevant for the project. The predicted noise emission levels from Gunlake Quarry at R7 and R8 are provided in Table 6.15. Noise emission levels are predicted to be within the Development Consent limits and project specific noise limits (PSNLs) at both receiver locations from year 1 to year 30. Noise levels at R2 are predicted to be up to 10dB above the PSNLs which is considered to be a significant impact and entitles this location to voluntary acquisition upon request and therefore is not subject to the assessment criteria. Gunlake has purchased receivers R1, R3 and R4.

Table 6.15 Predicted Noise Levels LAeq (15 min) dB

Assessment Location	Day	Evening/Night	Night	Night
	Calm	Calm	Prevailing Winds*	Inversion#
Existing Quarry Operations (Pre – Extension Project)				
R7	33	31	34	34
R8	32	30	33	33
Quarry Operations (Gunlake Extension Project Years 1-30)				
R7	34	35	37	38
R8	33	34	37	37

* Max level based on wind speeds of 23m/s and wind directions from 360º to 112.5º from north based on data from the Gunlake weather station
# F class temperature inversion

To verify compliance with operational noise assessment criteria, noise measurements have been carried out at all source points and at the property boundary in the direction of the noise receptors. Attended noise monitoring is undertaken at N1 at the property boundary between the quarry and R7/R8.

Noise monitoring of the plant and equipment was undertaken as part of the environmental assessment for the Gunlake Extension Project to verify the sound power level of various plant and equipment. The results are provided in Table 6.16.

Table 6.16 Noise Monitoring Plant and Equipment

Plant and Equipment	Sound Power Level (L_w) (dB)
Primary Crusher	112
Secondary Crusher	115
Primary Screens	112
Tertiary Crusher and Impact Crusher	115
Secondary Screens	109
Front End Loader	112
Excavator	104
Dozer	112
Water Cart	102

Attended noise measurements were undertaken quarterly during the reporting period at N1 to the east of the quarry processing area. This location measures noise generated from the quarry travelling in the direction of sensitive receivers R7 and R8. The results are summarised in Table 6.17 and show compliance with the assessment criteria (Table 6.14) and are in line with the EIS predictions.

Table 6.17 - Gunlake Quarry Noise Monitoring Results 2018/19

Location	Date	Start Time	Total Noise dB(A) L_{eq}	Criterion dB(A) L_{eq}	Estimated Noise Contribution at Receiver Location	Identified Noise Sources (L_{eq} (15 min))
N1	25/9/18	9:07	61.58	R7 38 R8 37	<30 dB(A) <30 dB(A)	Normal quarry operations, water cart, dump trucks
N1	18/12/18	9:49	60.91	R7 38 R8 37	<30 dB(A) <30 dB(A)	Normal quarry operations, birds, dump truck, rock hammer.
N1	25/3/19	9:30	61.29	R7 38 R8 37	<30 dB(A) <30 dB(A)	Normal quarry operations, excavator, birds, dump truck, rock hammer
N1	25/6/19	10:06	60.63	R7 38 R8 37	<30 dB(A) <30 dB(A)	Normal quarry operations, dump truck, reversing alarms, rock dumped into hopper

6.6 Vibration and Air blasting

Table 6.18 shows the airblast overpressure criteria and ground vibration impact assessment criteria for residences on privately owned land in relation to the Gunlake Quarry Project as prescribed by Condition 10, Schedule 3 of the Development Consent.

Table 6.18 Airblast Overpressure and Ground Vibration Impact Assessment Criteria

Airblast Overpressure Level (dB (Lin Peak))	Allowable Exceedances
115	5% total number of blasts over 12 month period.
120	0%
Ground Vibration Level (mm/s)	**Allowable Exceedances**
5	5% total number of blasts over 12 month period.
10	0%

A blast overpressure and ground vibration assessment was undertaken at various distances from the blast locations at the Quarry. The results shown in Table 6.19 convey that a large range of MICs can be adopted, based on the distance from the blast. Blasting may occur at 700m from the nearest assessment location, and the ANZECC limits will be satisfied with a respective MIC of 290kg.

Table 6.19 Blast Overpressure and Ground Vibration EIS Assessment Results for Hard Rock Extraction

Distance from Blast (m)	Highest Allowable MIC (kg)	Overpressure Criteria (dB (Lin Peak))	Ground Vibration Criteria PPV (mm/s)	Highest Allowable MIC (kg) to satisfy criteria
700	290	≤115	≤5	290
900	600	≤115	≤5	600
1,100	1,150	≤115	≤5	1,150
1,300	1,900	≤115	≤5	1,900

A portable blast emissions monitor that measures airblast overpressure and vibration is positioned at R2 on Brayton Road during each blast event. Monitoring will continue at this location in the coming reporting period.

Table 6.20 details the Airblast Overpressure and the Ground Vibration level monitoring results for all the blasts undertaken at Gunlake during the reporting period. All blasting was undertaken within the approved time between 9:00am to 5:00pm Monday to Friday.

Table 6.20 Blast Monitoring Summary for the Reporting Period

Date	Time	Location	Airblast Overpressure (dB (Lin Peak))	Ground Vibration Level (mm/s)
17/7/2018	12.42	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
23/7/2018	13.51	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
8/8/2018	13.35	Lot 575 Brayton Rd	116.30	1.80
17/8/2018	13.03	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
27/8/2018	12.35	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
3/9/2018	13.36	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
3/9/2018	13.43	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
17/9/2018	14.58	Lot 575 Brayton Rd	112.0	0.86
25/9/2018	13.43	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
28/9/2018	12.02	Lot 575 Brayton Rd	101.0	1.02

Date	Time	Location	Airblast Overpressure (dB (Lin Peak))	Ground Vibration Level (mm/s)
5/10/2018	14.19	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
12/10/2018	12.00	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
19/10/2018	11.23	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
26/10/2018	13.08	Lot 575 Brayton Rd	111.8	0.95
2/11/2018	11.55	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
9/11/2018	11.32	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
26/11/2018	12.00	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
30/11/2018	12.22	Lot 575 Brayton Rd	107	1.5
11/12/2018	14.49	Lot 575 Brayton Rd	105.5	0.751
29/01/2019	12.08	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
1/02/2019	12.49	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
15/02/2019	12.53	Lot 575 Brayton Rd	109.5	0.696
22/02/2019	9.58	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
1/03/2019	10.40	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
15/03/2019	12.41	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
29/03/2019	13.58	Lot 575 Brayton Rd	111.5	0.925
12/04/2019	12.45	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
26/04/2019	11.01	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
10/05/2019	14.05	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
20/05/2019	12.19	Lot 575 Brayton Rd	111.2	0.751
31/05/2019	14.04	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
7/06/2019	9.26	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
14/06/2019	12.12	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger
21/06/2019	14.18	Lot 575 Brayton Rd	Nil Trigger	Nil Trigger

During the reporting period a total of 34 blasts were conducted. The maximum air blast overpressure result for the reporting period was 116.3 dB (Lin Peak) recorded at Lot 529 Brayton Road on 8th August 2018. This result was slightly higher than the maximum for the previous reporting period being 115.0 dB (Lin Peak). Results for 33 blasts were below the criteria of 115 dB (Lin Peak) outlined in Table 3.18. Only one result was over the criteria, which is less than a 5% exceedance and therefore in compliance.

The ground vibration results show compliance with impact assessment criteria with the maximum recorded on 8th August 2018 being 1.80 mm/s. This was slightly lower than the previous reporting period's maximum of 1.89 mm/s however both maximums are well below the impact assessment criteria of 5mm/s as detailed in the NBMP.

The results confirm the EIS predictions that the project will comply with relevant vibration and air blast criteria at all sensitive receivers through ongoing management of blast design.

6.7 Aboriginal Heritage

Gunlake's Aboriginal Heritage Management Plan was updated in April 2018 as required by the Development Consent. The Plan outlines a six step mitigation process for the accidental discovery of cultural heritage items, and a five step mitigation process for the accidental discovery of skeletal material. No skeletal material were discovered during the reporting period, nor the previous reporting period.

Extensive surveys of the areas subject of the Gunlake Extension Project were undertaken as part of the Aboriginal Cultural Heritage Assessment (ACHA) for the EIS. An Aboriginal site collection report was conducted by EMM Consulting Pty Limited and assisted by representatives from Registered Aboriginal Parties on 25/07/2018. The site survey involved the collection of Aboriginal stone artefact sites which would otherwise be impacted during

quarrying operations for the extension project. A total of 867 artefacts were salvaged during the survey.

6.8 Bushfire

Under the *Rural Fires Act 1997,* there are a number of obligations that must be met by Gunlake with respect to managing their land. In summary, these include:

- Occupiers of land are to extinguish fires or notify firefighting authorities immediately; and
- It is the duty of the owner or occupier of land to take practicable steps to prevent the occurrence of bush fires on, and to minimise the danger of the spread of bush fires on or from that land.

These issues are relevant, given the location of the quarry having native forested areas to the south and will include additional reaforestated areas on site. The following measures are employed at the site to ensure that these obligations under the Rural Fires Act are met:

- The main water storages on site are available for fighting purposes if required. This includes the main farm dam and PWD adjacent to the workshop.
- Maintaining the agricultural component of the property to avoid significant quantities of long dry grass. Management activities include active grazing or slashing as required.
- Firebreaks are maintained around key infrastructure areas including the office and main access road to the site.

Fire fighting equipment is available on site at the office, workshop, and mobile equipment.

6.9 Hydrocarbon Contamination

Plant and equipment are serviced regularly to maintain good working order and lubricants and oils for servicing of plant are stored in the workshop and bunded. Spill kits are kept on site. The site fuel tank is self bunded

6.10 Waste Management

Gunlake operates a comprehensive management system for the appropriate handling and disposal of waste materials. The principle wastes generated by the site are categorised as non-production and production wastes.

6.10.1 Non-Production Wastes

6.10.1.1 General Domestic-Type Wastes and Routine Maintenance Consumables

All general wastes originating from the office and workshop area, together with routine maintenance wastes from the servicing of equipment are disposed of in 205L drums and 240L mobile garbage bins located adjacent to the various buildings on site. These bins are collected weekly or as required into skips adjacent to the workshop, which is then collected by a licensed waste contractor.

Recyclables such as paper, cardboard, drink containers, ferrous and non-ferrous metals, are contained separately and collected by a licensed waste contractor for recycling.

6.10.1.2 Oils and Greases

Routine maintenance of quarrying and earthmoving equipment is undertaken in the maintenance workshop. Waste oils are collected and pumped to bulk storage tanks by oil excavation pumps.

Waste oils and grease are stored in a bunded area at the maintenance workshop and collected by an EPA licensed waste oil recycling contractor for recycling.

6.10.1.3 Sewerage

All domestic waste water is collected and treated in a purpose-built approved wastewater management system.

6.10.2 Production Wastes

6.10.2.1 Overburden

Overburden was used to progressively construct the bund wall. Overburden from the current extraction area is being placed on the new emplacement area to the north west of the pit.

6.10.2.2 Potentially Contaminated Water

Runoff from the maintenance workshop, washdown pad and fuel storage areas is directed to pass through an oil separator. Collected oils are stored with other waste hydrocarbons. Uncontaminated water passes from the oil separator into the surface water collection system.

6.10.2.3 Tyres

Quarry trucks and machinery generate a small number of waste tyres. These are stored on site and sent to licensed land fill as required.

7. WATER MANAGEMENT

The attributes of the Quarry form the basis of ongoing management principles governing the need to protect water systems, both surface and groundwater, during quarrying activities as well as managing the remaining land for agricultural and biodiversity uses.

The operation lies within the Chapman's Creek Catchment. Chapman's Creek is an ephemeral creek which flows through the property roughly from south to north. The water management system has been designed to protect Chapman's Creek.

7.1 Erosion and Sediment Management

Gunlake Quarry operates in accordance with the Gunlake Water Management Plan which contains an Erosion and Sediment Control Plan. Specifically, the Plan includes:

- Implementation of the requirements set out in the publication "Managing Urban Stormwater: Soils and Construction Volume 1, 4th Edition, 2004 (Landcom, 2004)", referred to as the *'Blue Book'* and Volume 2E Mines and Quarries (DECC, 2008);

- Detailing practices that have potential to cause erosion and generate sediment and what control measures will be adopted to minimise the impact of these practices; and

- Detailing the location function and capacity of erosion and sediment control structures and how they will be maintained.

The design of the quarry has included the construction of rock-lined drains and check dams, sediment traps and water quality control ponds to contain dirty water. These structures were constructed as part of the initial quarry development and are maintained as necessary in order ensure adequate storage to capture runoff from storm events and maintain a nil discharge site, and to minimise erosion and sedimentation. During the reporting period, maintenance work was undertaken on the drainage adjacent to the workshop and weigh bridge, with an upgrade to the drain directing dirty water into PWD.

Plate 6 Rehabilitation of Bund Wall / Overburden Emplacement Area with Drain in Foreground

7.2 Surface Water Management

7.2.1 Pollution Control Strategies

Gunlake Quarry operates under an approved Water Management Plan. This Plan was updated following the approval of the Gunlake Extension Project. Stormwater is collected in a series of pollution control structures which is then recycled within the process water circuit. Collected water is utilised for the:

- Crushing plant;
- Dust suppression on roads and hardstand areas;
- Pasture irrigation (when required to dispose of excess site water);
- Truck washing; and
- Non-potable domestic water.

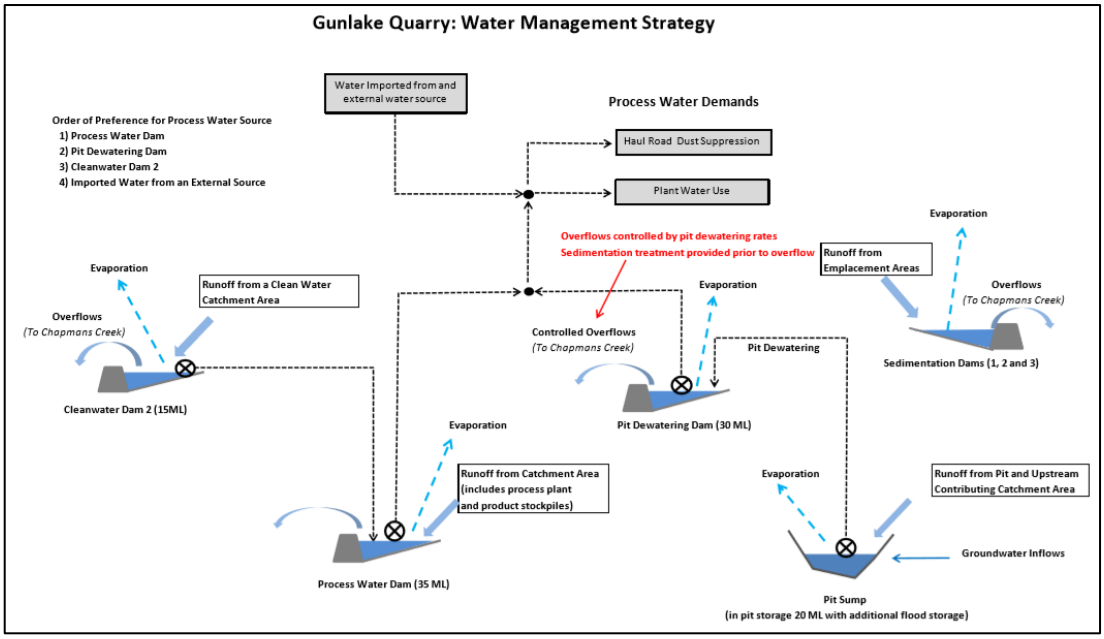


Plate 7 – Surface Water Management Plan

Plate 8 Process Water Dam

7.2.2 EIS Assessment and Predictions

No specific assessment criteria were provided in the EIS in relation to surface water. The EIS however, made the following Surface water management objectives;

- Separation of clean and quarry water circuits using clean water diversion drains up gradient from disturbance areas. This will minimise water treatment required on site.

- Providing sedimentation basins of an appropriate size for all catchment areas based on '*Managing Urban Stormwater: Soils and Construction, Volume 2E– Mines and Quarries'* (DECC, 2008).
- Suitable management of excess water in the pit by pumping to a pit dewatering dam that will hold water for process water usage.
- The volume and frequency of site discharge will be minimised by capturing water from disturbed areas in water management dams to be used as process water.
- Site discharge locations have been established and characterised for each stage of the quarry plan.
- Model the quarry's operational water demands to estimate process water needs and supply reliability, including dam storage volumes.
- Use of an ongoing monitoring and review program to enable improvement of the Surface Water Management Plan as the operation expands.

7.2.3 Monitoring and Reporting

Gunlake Quarry undertakes quarterly monitoring of surface water quality within Chapman's Creek at two sites within the project boundary to determine a basis for potential impact assessment as the quarry progresses. The data shows that the upper reaches of Chapmans Creek are predominantly dry and only flow following heavy rain events, while the lower section towards Brayton Road at the Gunlake property boundary consists largely of unconnected stagnant pools which respond more quickly to rainfall events and tend to dry rapidly in periods of dry weather.

The sites include two sampling locations on Chapmans Creek downstream of the operation known as RW1 and RW2. RW1 is located at the Quarry entrance adjacent to Brayton Road, whilst RW2, which is often dry, is sampled approximately 1km upstream of RW1 within the property. The upstream site previously recorded as Site I is no longer monitored as sufficient background data on Chapmans Creek exists for the purposes of impact assessment.

The water quality has been monitored and significant parameters outlined in the TARPs including pH, EC and TDS have been compared to historical background levels taken at Site I in order to identify any harmful changes to the creeks' water quality. Chapman's Creek flows into Joaramin Creek approximately 1.4 km downstream from the Gunlake project boundary, and Joaramin Creek eventually flows into the Wollondilly River.

Tables 7.1 to 7.4 provide summaries of the surface water monitoring for the 2018/2019 reporting period. Monitoring is undertaken on a quarterly basis and sample results from the Process Water Dam (PWD) and the Drop Cut are also included.

Table 7.1 Monitoring Results for RW1

Analyte	Units	Sample Date			
		27/09/2018	29/11/2018	02/4/2019	02/7/2019
pH	pH units	7.81	7.53	7.73	8.34
Electrical Conductivity	uS/cm	537	850	248	1760
Total Suspended Soilds (TSS)	mg/L	68	194	20	14
Total Dissolved Solids (TDS)	mg/L	349	552	161	1140
Total Phosphorus as P (TP)	mg/L	<0.01	0.14	0.09	0.01
Total Nitrogen as N (TN)	mg/L	1.1	1.8	0.9	0.8
Dissolved Oxygen (DO)	mg/L	7.7	9.2	6.3	12
Turbidity	NTU	74.2	312	32.7	3.9
Chloride	mg/L	92	259	39	481
Calcium	mg/L	22	23	13	50

Analyte	Units	Sample Date			
		27/09/2018	29/11/2018	02/4/2019	02/7/2019
Magnesium	mg/L	17	33	9	68
Sodium	mg/L	44	84	24	185
Potassium	mg/L	4	5	5	5
Total Aluminium	mg/L	1.79	14.8	----	----
Total Arsenic	mg/L	<0.001	0.002	<0.001	<0.001
Total Cobalt	mg/L	<0.001	0.005	<0.001	<0.001
Total Copper	mg/L	0.003	0.01	<0.001	0.002
Total Manganese	mg/L	0.116	0.224	0.051	0.011
Total Nickel	mg/L	<0.001	0.007	0.001	<0.001
Total Zinc	mg/L	0.01	0.027	0.007	<0.005
Total Iron	mg/L	1.28	11.3	1.26	0.16
Oil and Grease	Visual	None Vis ble	None visible	None visible	None visible

Table 7.2 Monitoring Results for RW2

Analyte	Units	Sample Date			
		27/09/2018	29/11/2018	02/4/2019	02/7/2019
pH	pH units	DRY	7.79	7.95	7.98
Electrical Conductivity	uS/cm		1530	4730	2860
Total Suspended Soilds (TSS)	mg/L		30	10	15
Total Dissolved Solids (TDS)	mg/L		994	3070	1860
Total Phosphorus as P (TP)	mg/L		0.07	<0.01	<0.01
Total Nitrogen as N (TN)	mg/L		2.2	0.6	6.6
Dissolved Oxygen (DO)	mg/L		9.4	7.4	11.3
Turbidity	NTU		59.5	1.1	0.9
Chloride	mg/L		480	1200	733
Calcium	mg/L		39	107	67
Magnesium	mg/L		64	172	112
Sodium	mg/L		156	428	315
Potassium	mg/L		5	8	6
Total Aluminium	mg/L		3.15	----	----
Total Arsenic	mg/L		<0.001	<0.001	<0.001
Total Cobalt	mg/L		0.001	<0.001	0.001
Total Copper	mg/L		0.003	<0.001	0.005
Total Manganese	mg/L		0.115	0.136	0.006
Total Nickel	mg/L		0.002	0.001	<0.001
Total Zinc	mg/L		0.006	<0.005	<0.005
Total Iron	mg/L		2.26	0.17	0.05
Oil and Grease	Visual		None visible	None visible	None visible

Due to dry weather conditions at the time of sampling and the nature of the location of Site RW2 being further upstream in Chapmans Creek, no samples were obtained for this site during September 2018.

Table 7.3 Monitoring Results for PWD

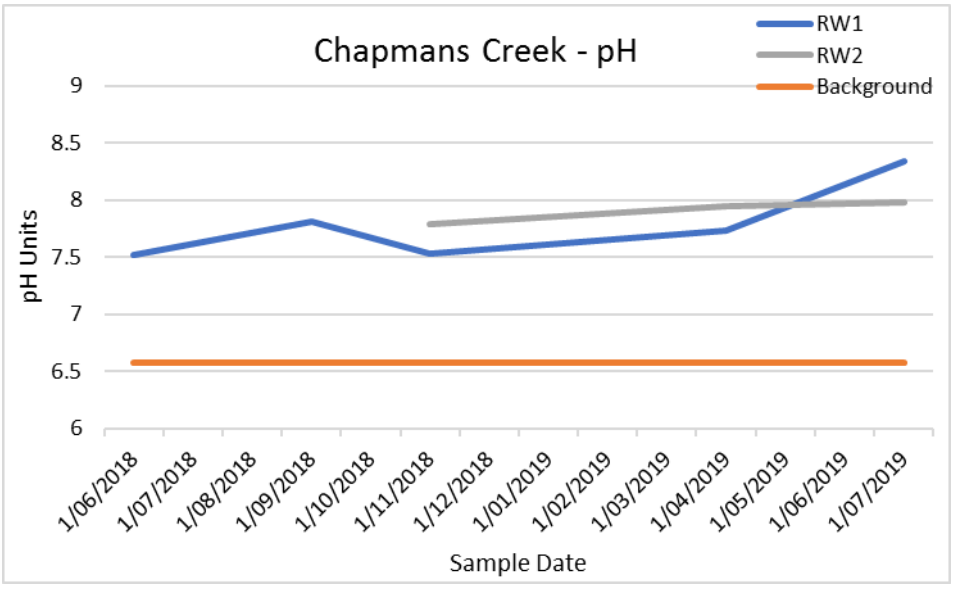
Analyte	Units	Sample Date			
		27/09/2018	29/11/2018	02/4/2019	02/7/2019
pH	pH units	9.17	8.39	8.21	8.01
Electrical Conductivity	uS/cm	856	374	518	360
Total Suspended Soilds (TSS)	mg/L	32	150	91	98
Total Dissolved Solids (TDS)	mg/L	556	243	337	234
Total Phosphorus as P (TP)	mg/L	<0.01	0.08	0.09	0.09
Total Nitrogen as N (TN)	mg/L	3.8	4.3	6.1	3.6
Dissolved Oxygen (DO)	mg/L	9.3	9.3	8.6	11.3
Turbidity	NTU	29.3	347	118	218
Chloride	mg/L	154	54	56	44
Calcium	mg/L	18	9	13	9
Magnesium	mg/L	25	8	12	8
Sodium	mg/L	106	53	75	54
Potassium	mg/L	7	3	4	3
Total Aluminium	mg/L	1.31	12.6	----	----
Total Arsenic	mg/L	<0.001	0.002	<0.001	0.001
Total Cobalt	mg/L	<0.001	0.005	0.001	0.004
Total Copper	mg/L	0.004	0.007	<0.001	0.006
Total Manganese	mg/L	0.083	0.232	0.071	0.202

Analyte	Units	Sample Date			
		27/09/2018	29/11/2018	02/4/2019	02/7/2019
Total Nickel	mg/L	<0.001	0.005	0.002	0.003
Total Zinc	mg/L	<0.005	0.034	0.014	0.03
Total Iron	mg/L	10.5	10.7	4.66	8.01
Oil and Grease	Visual	None visible	None visible	None visible	None visible

Table 7.4 Monitoring Results for Drop Cut

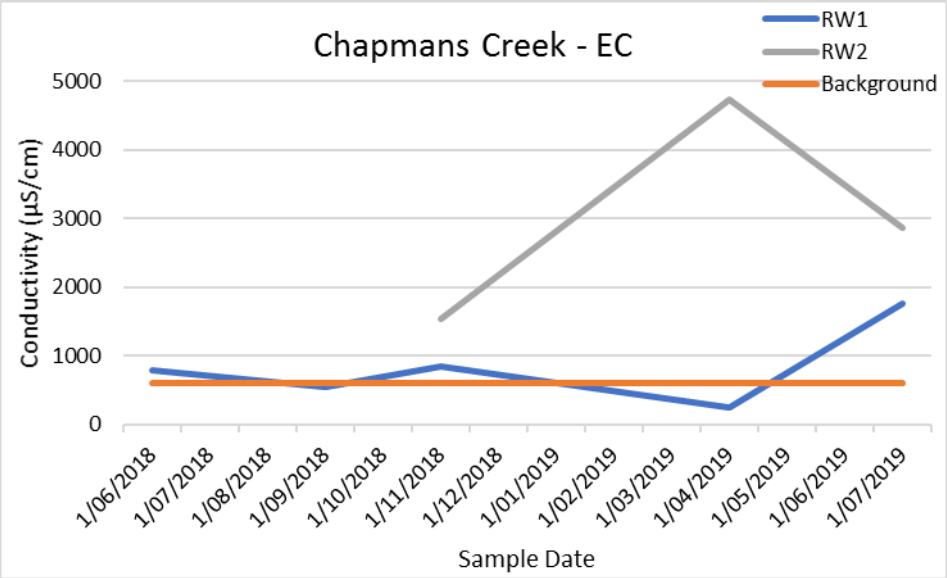
Analyte	Units	Sample Date			
		27/09/2018	29/11/2018	02/4/2019	02/7/2019
pH	pH units	No Sample	8.09	7.94	8.56
Electrical Conductivity	uS/cm		1260	882	933
Total Suspended Soilds (TSS)	mg/L		14	16	5
Total Dissolved Solids (TDS)	mg/L		819	573	606
Total Phosphorus as P (TP)	mg/L		0.01	0.04	<0.01
Total Nitrogen as N (TN)	mg/L		11.1	5.4	5.8
Dissolved Oxygen (DO)	mg/L		9.4	8.8	11.6
Turbidity	NTU		24.3	7.3	0.9
Chloride	mg/L		349	162	216
Calcium	mg/L		42	29	34
Magnesium	mg/L		47	27	34
Sodium	mg/L		128	75	90
Potassium	mg/L		6	5	5
Total Aluminium	mg/L		1.12	----	----
Total Arsenic	mg/L		<0.001	<0.001	<0.001
Total Cobalt	mg/L		<0.001	<0.001	<0.001
Total Copper	mg/L		0.003	<0.001	<0.001
Total Manganese	mg/L		0.032	0.01	0.006
Total Nickel	mg/L		0.001	<0.001	<0.001
Total Zinc	mg/L		<0.005	<0.005	<0.005
Total Iron	mg/L		0.88	0.18	0.12
Oil and Grease	Visual		None visible	None visible	None visible

Graphs 7.1 - 7.5 present the water quality parameters in Chapmans Creek over the last reporting period.



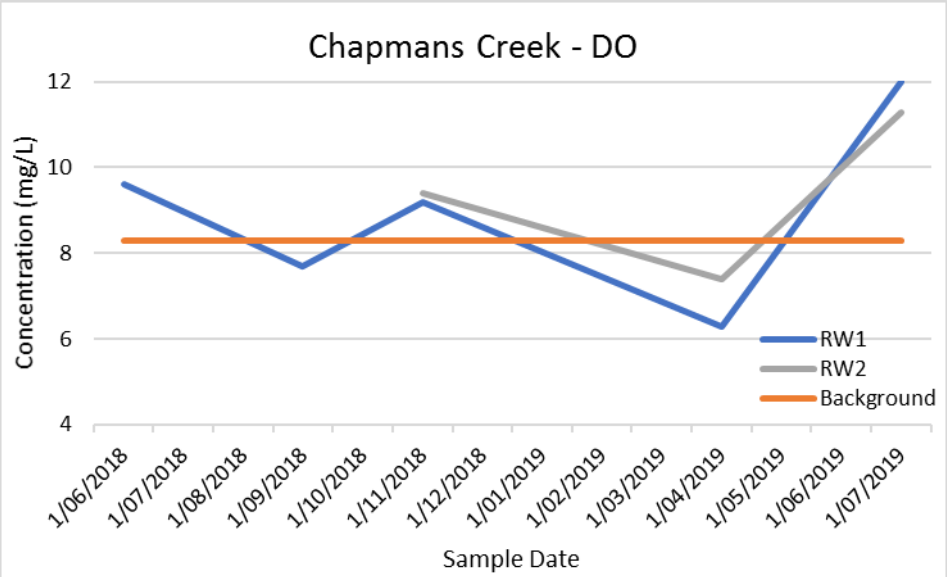
Graph 7.1 – Chapmans Creek pH

The data shows that water quality in Chapmans Creek is largely influenced by groundwater baseflow. Salt levels at RW1 and RW2 respectively average at 796 µS/cm and 3040 µS/cm (Graph 7.2) with a pH slightly above neutral (Graph 7.1). During high flow, the salt content would likely decrease.

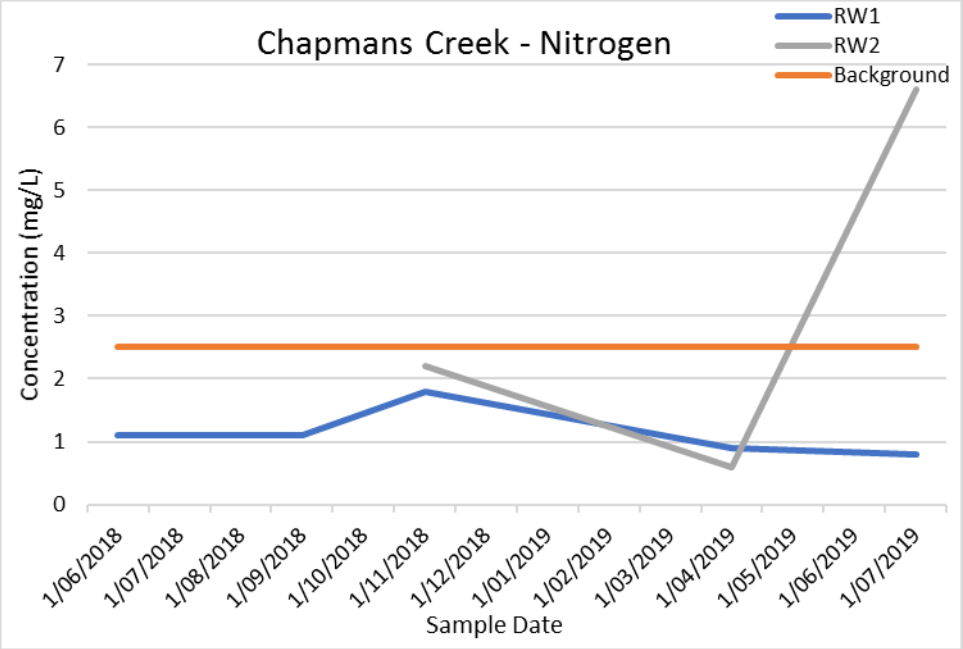


Graph 7.2 - Chapmans Creek Electrical Conductivity

Dissolved oxygen levels presented in Graph 7.3 remain in a range for healthy aquatic biodiversity in line with background levels from the upstream Site I.

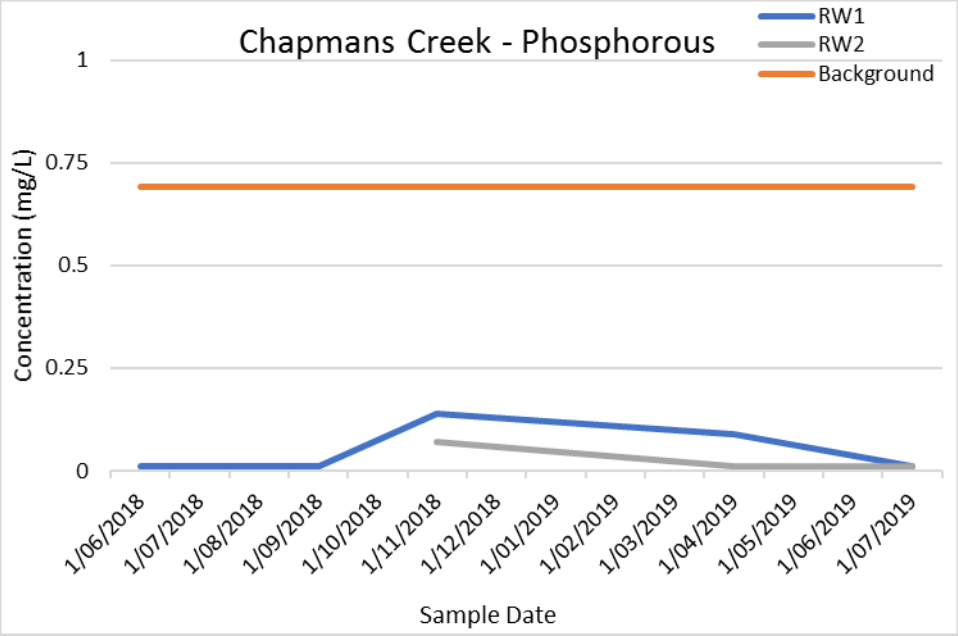


Graph 7.3 – Chapmans Creek Dissolved Oxygen



Graph 7.4 – Chapmans Creek Total Nitrogen

Levels of total Nitrogen show fluctuation which is likely due to fertilisation of the agricultural properties upstream and downstream of the quarry (Graph 7.4). Total Phosphorus levels shown in Graph 7.5 are consistently below 0.2mg/L and are well below the background average of 0.7mg/L at Site I.



Graph 7.5 – Chapmans Creek Total Phosphorous

7.2.4 Stream Health Monitoring

As with most ephemeral streams, the intermittent flow events in Chapmans Creek give rise to infrequent but often high sediment movement. Ephemeral streams tend to remain apparently stable for long periods until major storm events when high flows cause channel scour and

mass movement of sediment downstream. Although these are natural events, the loss of riparian vegetation through past agricultural activities can result in higher than normal instability of channels and banks. Four monitoring points have been identified along the creek and are monitored quarterly to observe changes over time. The results of this monitoring are included in Appendix C.

During the reporting period, no evidence of any further erosion was recorded at the four monitoring points. Erosion is minimal at point 1, as banks are shallow and are well vegetated. The previous year has not received heavy rain, and no changes to erosion was visible at the second monitoring point. Highly disturbed riparian vegetation is visible at site 3. The roots of large trees growing on the embankment are exposed due to erosion, although no changes were observed in 2018/2019. The gully erosion at monitoring site 4 has not extended during this period, however continued monitoring is required following heavy rainfall.

There has been no change to the four monitoring points over the reporting period, and the creek is deemed to currently be in a stable state. Quarterly monitoring will continue over the coming reporting period with additional monitoring following heavy rainfall. Subject to management provisions in the conservation agreement and rehabilitation and biodiversity offset management plan, staged management of the Creek will be scheduled in future reporting periods.

7.2.5 Future Improvements

Surface water quality remains within a healthy range and will continue to be monitored on a quarterly basis in the 2019/2020 reporting period.

7.3 Groundwater Management

7.3.1 Groundwater Monitoring

Baseline data on static water level, water quality and rock permeability was obtained from a broad network of monitoring bores distributed around the current and future quarry area. Ongoing monitoring will continue with two groundwater monitoring bores GM6 and GM13 located in proximity to the pit. The direction of the groundwater flow is generally to the northwest following the surface topography. Bores GM24 and GM36 were last sampled in September 2018 prior to being removed as the pit area was expanded.

The Groundwater Monitoring component of the Gunlake Groundwater Management Plan provides a set of trigger levels for investigating any potential adverse groundwater impacts. The initial triggers relate to physical and chemical descriptors of water quality which may be influenced by quarrying activities. These triggers will be updated as the range of natural background variability is refined through ongoing monitoring. The current triggers relating to groundwater quality are:

- A ‘significant’ decrease in pH (pH less than 6); and
- A gradually increasing trend in EC and TDS values in GM6 and GM13.

Table 7.5 presents average analytical results for the background groundwater as sampled from a series of 9 groundwater monitoring bores determined from samples collected in June 2007 prior to the commencement of quarrying activities.

Table 7.5 Summary of Background Bore Water Quality

Analyte	Range	Average
pH (pH units)	6.8-7.3	6.9
EC (uS/cm)	720-7210	3232
Sodium (mg/L)	110-575	293
Calcium (mg/L)	17-530	224
Potassium (mg/L)	2.5-18	9.7
Magnesium (mg/L)	17-435	177
Ammonia (mg/L)	<0.1-1.4	0.7
Chloride (mg/L)	110-2620	1093
Sulphate (mg/L)	3-44	17
Bicarbonate (mg/L)	210-760	490
Carbonate (mg/L)	<1	<1
Nitrate (mg/L)	<0.1-7.1	2.02
Nitrite (mg/L)	<0.1-0.33	0.14
Phosphate (mg/L)	<0.01-0.04	0.02
Total Phosphorous (mg/L)	0.33-4.0	1.16
Copper (mg/L)	0.001-0.003	0.002
Lead (mg/L)	<0.001	<0.001
Zinc (mg/L)	0.002-0.010	0.005
Cadmium (mg/L)	<0.0002	<0.0002
Chromium (mg/L)	<0.01	<0.01
Nickel (mg/L)	<0.01	<0.01
Total Iron (mg/L)	14-82	42
Dissolved Iron (mg/L)	<0.01-0.69	0.09
Arsenic (mg/L)	<0.01	<0.01
Mercury (mg/L)	<0.0001	<0.0001

Tables 7.6 to 7.10 show the monitoring data during the reporting period for bores GM6, GM13, GM24 and GM36.

Table 7.6 Groundwater Quality Monitoring Results and Summary GM 6

Parameter	Unit of Measure	Sample Date: 25/9/18	Sample Date: 20/12/18	Sample Date:02/4/19	Sample Date:02/7/19	Reporting Period Average
pH	pH units	6.84	6.97	7.21	6.83	6.96
Electrical Conductivity	µS/cm	254	176	201	230	215
Total Dissolved Solids	mg/L	165	114	131	150	140
Hardness	mg/L	58	49	55	62	56
Chloride	mg/L	24	20	20	24	22
Sulfate	mg/L	<5	<1	1	2	1.5
Bicarbonate alkalinity	mg/L	90	60	66	79	73.75
Carbonate alkalinity	mg/L	<1	<1	<1	<1	<1
Hydroxide alkalinity	mg/L	<1	<1	<1	<1	<1
Total alkalinity	mg/L	90	60	66	79	73.75
Calcium	mg/L	10	8	9	10	9.25
Iron (dissolved)	mg/L	1.09	0.26	1.94	2.61	1.48
Magnesium	mg/L	8	7	8	9	8
Potassium	mg/L	3	5	4	4	4
Sodium	mg/L	24	21	22	24	22.75
Iron (total)	mg/L	3.85	1.79	4.55	4.91	3.78
Arsenic	mg/L	0.003	0.002	0.002	0.002	0.002
Cadmium	mg/L	<0.0001	0.0001	<0.0001	<0.0001	0.0001
Chromium	mg/L	0.003	0.002	0.003	0.003	0.003
Copper	mg/L	0.007	0.011	0.006	0.007	0.008
Lead	mg/L	0.012	0.007	0.009	0.008	0.009
Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Parameter	Unit of Measure	Sample Date: 25/9/18	Sample Date: 20/12/18	Sample Date:02/4/19	Sample Date:02/7/19	Reporting Period Average
Nickel	mg/L	0.022	0.012	0.015	0.016	0.016
Zinc	mg/L	0.006	0.047	0.029	0.038	0.03
Ammonia as N	mg/L	0.17	0.6	0.67	0.61	0.51
Nitrite as N	mg/L	<0.01	0.01	0.02	<0.01	0.01
Nitrate as N	mg/L	0.33	0.57	0.13	0.3	0.33
Total Phosphorus as P	mg/L	0.11	0.21	0.25	0.08	0.16
Reactive Phosphorus	mg/L	<0.01	0.09	0.07	0.01	0.04

Table 7.7 Groundwater Quality Monitoring Results and Summary GM 13

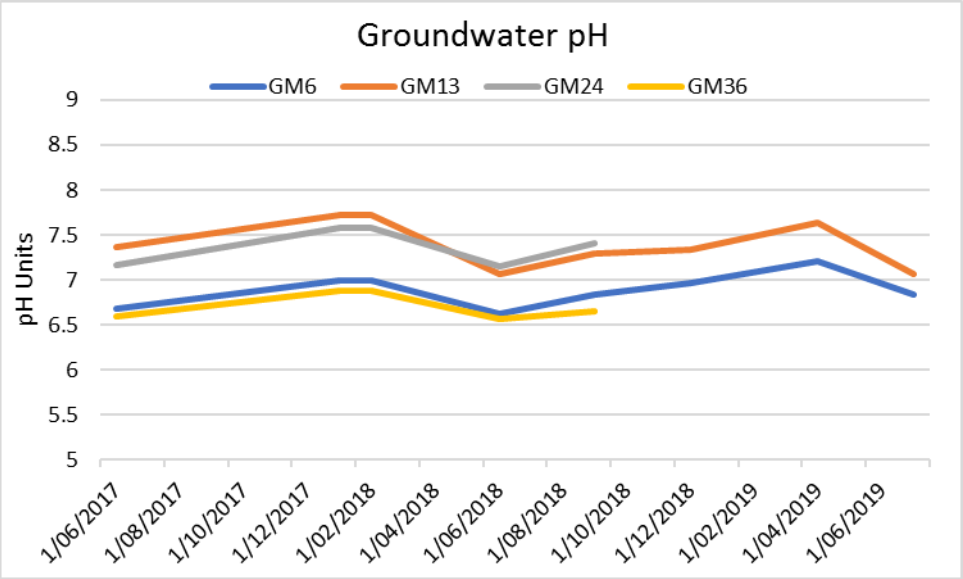
Parameter	Unit of Measure	Sample Date: 25/9/18	Sample Date: 20/12/18	Sample Date:02/4/19	Sample Date:02/7/19	Reporting Period Average
pH	pH units	7.29	7.33	7.64	7.07	7.33
Electrical Conductivity	µS/cm	1640	2380	2340	3700	2515
Total Dissolved Solids	mg/L	1070	1550	1520	2400	1635
Hardness	mg/L	548	763	672	1180	7901
Chloride	mg/L	384	582	545	937	612
Sulfate	mg/L	11	10	11	12	11
Bicarbonate alkalinity	mg/L	282	292	235	325	2834
Carbonate alkalinity	mg/L	<1	<1	<1	<1	<1
Hydroxide alkalinity	mg/L	<1	<1	<1	<1	<1
Total alkalinity	mg/L	282	292	235	325	2834
Calcium	mg/L	104	144	124	206	1445
Iron (dissolved)	mg/L	0.05	0.06	0.11	0.54	0.19
Magnesium	mg/L	70	98	88	163	105
Potassium	mg/L	9	12	10	14	11
Sodium	mg/L	120	165	149	243	169
Iron (total)	mg/L	0.1	0.06	0.2	1.13	0.38
Arsenic	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	mg/L	<0.001	0.001	0.001	0.008	0.003
Copper	mg/L	0.008	0.015	0.011	0.027	0.015
Lead	mg/L	<0.001	<0.001	<0.001	0.001	0.001
Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	0.0001
Nickel	mg/L	0.037	0.013	0.014	0.032	0.024
Zinc	mg/L	0.006	0.093	0.033	0.156	0.072
Ammonia as N	mg/L	0.06	0.1	0.04	0.25	0.11
Nitrite as N	mg/L	0.02	<0.01	<0.01	<0.01	0.009
Nitrate as N	mg/L	0.2	0.16	0.26	0.06	0.17
Total Phosphorus as P	mg/L	0.01	<0.01	<0.01	0.03	0.01
Reactive Phosphorus	mg/L	<0.01	<0.01	<0.01	<0.01	0.01

Table 7.8 Groundwater Quality Monitoring Results and Summary GM 24 and GM36

Parameter	Unit of Measure	GM24 Sample Date: 25/9/18	GM36 Sample Date: 25/9/18	Background Site Average
pH	pH units	7.29	7.33	7.31
Electrical Conductivity	µS/cm	1640	2380	2010
Total Dissolved Solids	mg/L	1070	1550	1310
Hardness	mg/L	548	763	656
Chloride	mg/L	384	582	483
Sulfate	mg/L	11	10	10.5
Bicarbonate alkalinity	mg/L	282	292	287
Carbonate alkalinity	mg/L	<1	<1	<1
Hydroxide alkalinity	mg/L	<1	<1	<1
Total alkalinity	mg/L	282	292	287
Calcium	mg/L	104	144	124
Iron (dissolved)	mg/L	0.05	0.06	0.055
Magnesium	mg/L	70	98	84
Potassium	mg/L	9	12	10.5
Sodium	mg/L	120	165	142.5
Iron (total)	mg/L	0.1	0.06	0.08
Arsenic	mg/L	<0.001	<0.001	<0.001
Cadmium	mg/L	<0.0001	<0.0001	<0.0001
Chromium	mg/L	<0.001	0.001	0.001
Copper	mg/L	0.008	0.015	0.0115
Lead	mg/L	<0.001	<0.001	<0.001
Mercury	mg/L	<0.0001	<0.0001	<0.0001
Nickel	mg/L	0.037	0.013	0.025

Parameter	Unit of Measure	GM24 Sample Date: 25/9/18	GM36 Sample Date: 25/9/18	Background Site Average
Zinc	mg/L	0.006	0.093	0.05
Ammonia as N	mg/L	0.06	0.1	0.08
Nitrite as N	mg/L	0.02	<0.01	0.02
Nitrate as N	mg/L	0.2	0.16	0.18
Total Phosphorus as P	mg/L	0.01	<0.01	0.01
Reactive Phosphorus	mg/L	<0.01	<0.01	<0.01

The monitoring to date shows that the groundwater varies from slightly basic to slightly acidic, having a narrow range of 1pH unit from 6.65 to 7.64 across the sites for the reporting period (Graph 7.6). The lowest pH recorded during the reporting period for bores GM6 and GM13 were 6.83 and 7.07 respectively, therefore not requiring investigation under the trigger levels. It should be noted that the quarry does not undertake any processes or store or use any materials that would cause a low pH to occur in the groundwater.



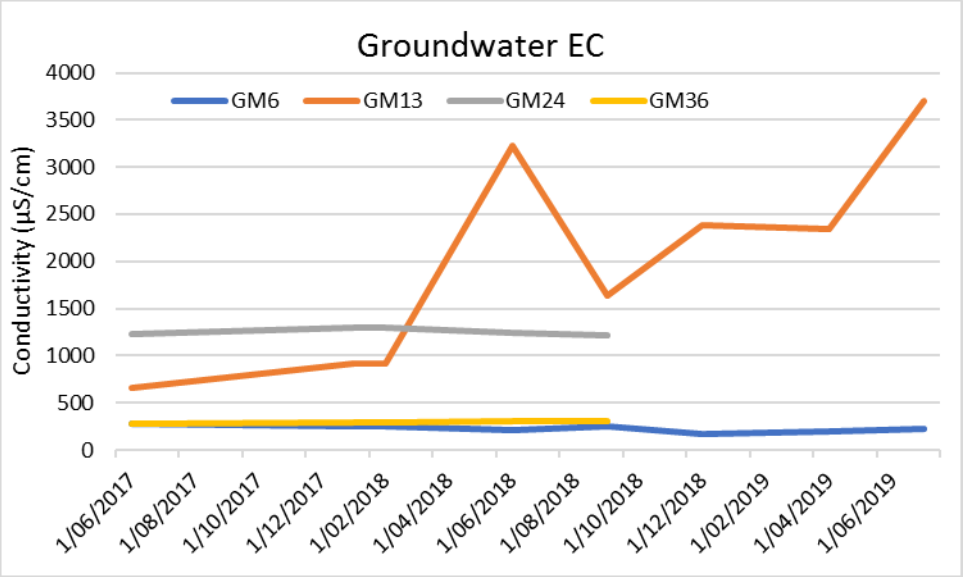
Graph 7.6 – Monitoring Bore Ground Water - pH

The bores show typical groundwater characteristics with conductivity ranging from 176 uS/cm to 254 uS/cm in bore GM6 and 1,640 uS/cm to 3,700 uS/cm for GM13 (Graph 7.7). The single samples taken from GM24 and GM36 presented salinity levels of 1,220 uS/cm and 310 uS/cm respectively. These concentrations have remained relatively consistent for all bores except for GM13 which showed a gradual increase during the reporting period.

In earlier reporting periods it was suspected that GM6 was diluted by rainwater to cause a lowered pH. The bores have been repaired and resealed to prevent rainfall and surface water entering the bores and fully purged using compressed air from a drill rig.

The salt content consists largely of chloride, magnesium and sodium ions. Metal levels are considered low and barely above detection limits for many of the parameters. This water quality would be suitable for typical stock and domestic purposes.

The background levels shown in Table 7.5 show conductivity levels in excess of 7000 uS/cm but having the same characteristics being dominated by chloride, sodium, magnesium and low levels of sulphates and metals with the exception of iron. Variability in concentration of parameters between sites indicate local changes in geology, particularly for conductivity and iron.



Graph 7.7 – Monitoring Bore Ground Water - Electrical Conductivity

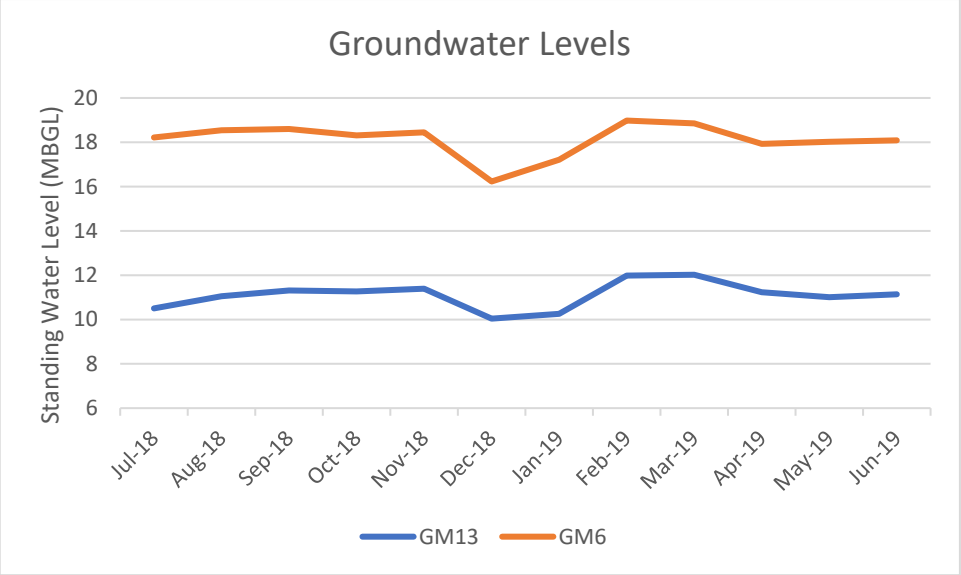
There are indications of some low levels of nutrients such as nitrate and phosphorus which could have come from agricultural practices in the area. Despite an increase in electrical conductivity in GM 13 the concentration is still below historical background levels. The concentration in June 2019 slightly exceeds the ANZECC Livestock Drinking Water Guideline which has been adopted as the assessment criteria for groundwater quality. The Trigger Action Response Plan as detailed in the Soil and Water Management Plan requires ongoing monitoring if an exceedance of the criteria occurs to establish any trends or correlations to quarrying activities to determine if the quarry is causing the increase in EC.

7.3.2 Groundwater Levels

The EIS has made assumptions of predicted groundwater levels using a series of transient models used to simulate the staged expansion of the extension project. The incorporation of the expanded pit shows levels of stress on the groundwater system. At the end of each development stage, the EIS has predicted the following impacts to the groundwater table:

- Stage 1: During the first five years excavation will only occur above the groundwater table, and no impacts on groundwater are predicted.
- Stage 2: Years 5 – 10 will see an interception of the groundwater table, resulting in a predicted 2m drawdown contour extending 300m from the edge of the pit.
- Stage 3: From year 10 – 20, the 2m drawdown contour will extend up to 1km from the pit footprint edge.
- Stage 4: During years 20 – 3, it is predicted that the drawdown will extend up to 1.5km.

The groundwater levels recorded during the reporting period are presented in Graph 7.8 below.



Graph 7.8 - GW6 and GW13 Depth

The depth of the monitoring bore GM13 overall remained relatively consistent during 2018/2019, with a range of 1.98m and an average of 11.1m (Graph 7.8). GM6 followed a similar pattern for the reporting period with an average standing water level of 18.1m below ground level and range of 2.75m. The depth range of these bores can be attributed to recharge of local aquifers following rainfall as can be seen in the reduction of depth in February. The results indicate that the quarry development is not impacting the standing water level in the bores. These results are in line with the EIS predictions.

7.3.3 Water Take

During the reporting period Gunlake received water access licence WAL42340 allowing for 37ML groundwater take per annum. No groundwater was extracted or used during the reporting period. The EIS predicts that groundwater will not be intercepted in the pit until year 5 of quarry operations.

In November 2018 water was required to be purchased for the site from external sources due to the drought conditions. Approximately 980,000L was purchased over a period of a week to maintain operations and dust suppression activities.

7.3.4 Future Improvements

There are no apparent significant variations or developing trends in groundwater quality as a result of the quarrying activity undertaken to date. The monitoring program will continue on a quarterly basis in the 2019/2020 period. Should there remain in increase in electrical conductivity in GM13 further assessment into any correlation with quarrying activities will be undertaken in the coming reporting period.

8. REHABILITATION

8.1 Rehabilitation Performance and Objectives

The Applicant must rehabilitate the site to the satisfaction of the Secretary. This rehabilitation must be generally consistent with the rehabilitation strategy in the EIS and must comply with the objectives in Table 8.1.

Table 8.1 Rehabilitation Objectives

Feature	Objective
Site (as a whole)	• Safe, stable and non-polluting • Final landform integrated with surrounding natural landforms as far as is reasonable and feasible • Final landform has minimal visual impact when viewed from surrounding land
Surface Infrastructure	• Decommissioned and removed, unless otherwise agreed by the Secretary
Land identified as the Biodiversity Area	• Conserved and enhanced with native, endemic vegetation consistent with the objectives
Riparian Corridors along Chapman Creek and its tributaries	• Stabilised and vegetated
Quarry benches	• Landscaped and vegetated using native tree and understorey species
Final Void	• Minimise the size, depth and slope of the batters of the final void • Minimise the drainage catchment of the final void

Table 8.2 Rehabilitation Performance

Area of Rehabilitation	Site Comment
Extent of the operations and rehabilitation at completion of the reporting period	During the reporting period the quarry was expanded further to the south and west as approved in the Gunlake Extension Project. Existing rehabilitation on the bund wall was maintained and no further planting was undertaken during the reporting period.
Agreed post- rehabilitation land use	The final land use will comprise the final void, rehabilitated emplacement area, conservations areas and agricultural areas within the Gunlake property.
Key rehabilitation performance indicators	The following performance criteria apply: • Key indicator species present in equivalent density to target vegetation community. • Indicator species successfully seed in two consecutive years.
Any other Rehabilitation Taken including: • Exploration activities; • Infrastructure;	There was no rehabilitation undertaken during the reporting period. Fencing of the Biodiversity areas commenced.

Area of Rehabilitation	Site Comment
• Dams; and • The installation or maintenance of fences, bunds and any other works	
Any rehabilitation areas which have received formal sign off from DRG	None to date
Variations to activities undertaken to those proposed (including why there were variations and whether DRG was notified)	No
Outcomes of trials, research projects and other initiatives	No trials were undertaken during the reporting period
Key issues that may affect successful rehabilitation	There are a number of issues that affect rehabilitation success and these include low volume of topsoil, extreme drought condition, feral animals, and seedling quality.

8.2 Progressive Rehabilitation Strategy

Gunlake has adopted a progressive approach to the rehabilitation of disturbed areas to ensure that where practicable areas where quarrying or overburden placement is completed are progressively shaped and vegetated to provide a stable landform. The rehabilitation of the site has been designed to integrate the re-establishment of agricultural land with the conservation of native vegetation and the creation of a riparian habitat corridor.

The outer extent of the overburden emplacement bund to the north east of the processing area has been shaped and revegetation work undertaken on the completed batters progressively (Plates 9 and 10). Maintenance of the rehabilitated area was undertaken during the reporting period, with infill planting of tubestock, weed control and maintenance of water control structures. Rehabilitation activities during the reporting period were largely focused on maintenance due the drought conditions. As previously discussed, the drought significantly restricted the rehabilitation activities at the site during the reporting period. Water levels in the drop cut and process water dam were at historic low levels and water was required to be maintained for dust suppression, processing and firefighting, therefore leaving no water for irrigation.

Plate 9 Rehabilitation of Bund Wall / Overburden Emplacement Area

Plate 10 Rehabilitation of Bund Wall / Overburden Emplacement Area

8.3 Key Environmental Issues and Management Measures

Due to active quarry development and emplacement of overburden rehabilitation areas are essentially limited to the bund wall. Ongoing drought conditions continue to challenge the rehabilitation success in this area. Replacement of unsuccessful tubestock and weed and erosion control comprise the main management measures for the rehabilitation area at present.

8.4 Actions for the Next Reporting Period

Table 8.3 Actions for the Next Reporting Period

Action	Site Comment
Describe the steps to be undertaken to progress agreement during next reporting period, where final rehabilitation outcomes have not yet been agreed between stakeholders	There will be further rehabilitation of the bund wall following final shaping in the next Annual Review period.
Outline proposed rehabilitation trials, research projects and other initiatives to be undertaken during next reporting period.	Monitoring of the conservation and offset areas will be undertaken during the next Annual Review period.
Summary of rehabilitation activities proposed for next report period.	There will be further rehabilitation of the bund wall following final shaping as well as further maintenance and weed spraying in the next Annual Review period.

9. COMMUNITY RELATIONS

9.1 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. Information is provided CCC along with other members of the community on request. The CCC is independently chaired and currently meets approximately three to four times per year. Minutes are available on the website.

Four CCC meetings were held during the reporting period, on the 27/7/2018, 19/10/2018, 15/2/2019 and 31/05/2019. These meetings discussed the Primary Transport Route Update, current employment, road use, provided a community update, and discussed the Biodiversity Modification DA.

Gunlake is committed to supporting the local community and welcome input from the Committee on other local Community events or projects that may benefit from Gunlake's support. Community events that Gunlake were involved in during 2018/2019 are listed below:

- Co-major sponsor of the 2019 Tallong Apple Day Festival with over 10,000 visitors;
- Financially supporting the upgrade of the Marulan Public School's playground facilities;
- Continued membership of Goulburn Mulwaree Council's Marulan Village Plan Working Party;
- Major sponsor of the 2018 Marulan Kite Festival's Art and Photographic Exhibition
- Sponsorship agreement with the Marulan Australia Day Committee as the event's major sponsor for the next 5 years from 2019.

Community liaison and support will continue in the coming reporting period.

9.2 Blast Liaison

In accordance with Schedule 3, Condition 13 of the Development Consent, Gunlake undertakes a notification process as detailed in the Noise and Blast Management Plan:

9.3 Community Complaints

No complaints were received during the reporting period. A complaints register is provided on Gunlake's website.

10. INDEPENDENT AUDIT

Condition 11 of Schedule 5 of the Development Consent for the project requires an independent environmental audit to be undertaken within a year of commencing development under the consent and every three years thereafter. The first independent environmental audit will be conducted in the first quarter of the coming reporting period and reported on in next year's Annual Review.

11. INCIDENTS AND NON-COMPLIANCES

Other than listed in Table 1.1, no non-compliances or reportable incidents occurred during the 2018-2019 period, as confirmed by this review.

12. ACTIVITIES PROPOSED FOR NEXT AEMR PERIOD

The following activities are planned to be undertaken in the coming reporting period:

- Further development of quarry in the Gunlake Extension Project Area
- Continue environmental monitoring in accordance with management plans, EPL and consent requirements
- Review management plans following Independent Environmental Audit
- Continue to update the website with monitoring data
- Management of conservation areas as per conservation agreement
- Completion of plant extension
- Spraying of tussock and blackberry
- Determination of development consent modification reduction in biodiversity areas.

APPENDIX A – Development Consent

ANNEXURE 'A'

OF S34 AGREEMENT FILED 30 JUNE 2017

IN PROCEEDINGS NO: 108663 OF 2017

CONDITIONS OF CONSENT

TABLE OF CONTENTS

DEFINITIONS

Aboriginal item or object	Any item or object that provides evidence of the use of an area by Aboriginal people, as defined under the *National Parks and Wildlife Act 1974*
AHD	Australian Height Datum
Annual Review	The review required by condition 10 of Schedule 5
Applicant	Gunlake Quarries Pty Ltd, or any other person/s who rely on this consent to carry out the development that is subject to this consent
BCA	Building Code of Australia
Biodiversity offset strategy	The conservation and enhancement strategy described in the EIS
Calendar Month	The first day of the month until the last day of the month
CCC	Community Consultative Committee
Conditions of consent	Conditions contained in Schedules 2 to 5 inclusive
Construction	The demolition of buildings or works, carrying out of works and erection of buildings covered by this consent
Council	Goulburn Mulwaree Council
Cured concrete waste	Cured concrete waste from a batch plant as defined in clause 49, Definitions of waste classifications, in Schedule 1 of the *POEO Act,* as in force from time to time
Day	The period from 7am to 6pm on Monday to Saturday, and 8am to 6pm on Sundays and Public Holidays
Department	Department of Planning and Environment
Development	The development as described in the documents listed in condition 2(a) of Schedule 2
DPI Water	Department of Primary Industries – Water
DPI Fisheries	Department of Primary Industries – Fisheries
DRG	Division of Resources and Geosciences within the Department
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement titled *Gunlake Quarry Extension Project,* dated April 2016 and prepared by EMM, and the Response to Submissions report titled *Gunlake Quarry Extension Project Response to Submission*s, dated September 2016 and prepared by EMM
EPA	NSW Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPL	Environment Protection Licence under the POEO Act
Evening	The period from 6pm to 10pm
Feas ble	Feas ble relates to engineering considerations and what is practical to build
GPS	Global Positioning System
Incident	A set of circumstances that: • causes or threatens to cause material harm to the environment; and/or • breaches or exceeds the limits or performance measures/criteria in this consent
INP	*NSW Industrial Noise Policy* (NSW EPA, 2000)
Laden trucks	Trucks transporting quarry products from the site and/or trucks transporting cured concrete waste to the site
Land	As defined in the EP&A Act, except where the term is used in the noise and air quality conditions in Schedules 3 and 4 of this consent, where it is defined as 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 consent
Material harm to the environment	Actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial
Minister	Minister for Planning, or delegate
Mitigation	Activities associated with reducing the impacts of the development
Neglig ble	Small and unimportant, such as to be not worth considering
Night	The period from 10pm to 7am on Monday to Saturday, and 10pm to 8am on Sundays and Public Holidays
OEH	Office of Environment and Heritage
POEO Act	*Protection of the Environment Operations Act 1997*
Primary transport route	Route from the site along Brayton Road, Ambrose Road and Red Hills Road
Privately-owned land	Land that is not owned by a public agency, the Applicant (or its subsidiary) or another quarry-owning company
Public infrastructure	Linear and other infrastructure that provides services to the general public, such as roads, railways, water supply, drainage, sewerage, gas supply, electricity, telephone, telecommunications, etc.
Quarrying operations	The extraction, processing, stockpiling and transportation of extractive materials carried out on the site, the associated removal of vegetation, topsoil and overburden, and the associated emplacement of overburden
Quarry products	Includes all saleable quarry products, but excludes tailings and other wastes
Reasonable	Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Rehabilitation	The restoration of land disturbed by the development to a good condition and for the purpose of establishing a safe, stable and non-polluting environment

RMS	Roads and Maritime Services
Secondary transport route	Route from the site to the Marulan interchange on the Hume Highway, along Brayton Road, across George Street, and under the Hume Highway
Secretary	Secretary of the Department, or nominee
Site	The land identified in Schedule 1
Truck movements	Truck movements mean heavy vehicle one-way trips, either entering or leaving the site

SCHEDULE 2
ADMINISTRATIVE CONDITIONS

OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT

1. In addition to meeting the specific performance measures and criteria established under this consent, the Applicant must implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or rehabilitation of the development.

TERMS OF CONSENT

2. The Applicant must carry out the development:
   (a) generally in accordance with the EIS; and
   (b) in accordance with the conditions of this consent, the Development Layout Plan and the Statement of Commitments.

   Notes: The Development Layout Plan is included in Appendix 1
   The Statement of Commitments is included in Appendix 2

3. If there is any inconsistency between the documents in condition 2(a), the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this consent shall prevail over all documents in condition 2(a) to the extent of any inconsistency.

4. The Applicant must comply with any requirement/s of the Secretary arising from the Department's assessment of:
   (a) any strategies, plans, programs, reviews, audits, reports or correspondence that are submitted in accordance with this consent (including any stages of these documents);
   (b) any reviews, reports or audits undertaken or commissioned by the Department regarding compliance with this consent; and
   (c) the implementation of any actions or measures contained in these documents.

LIMITS ON CONSENT

Quarrying Operations

5. The Applicant may carry out quarrying operations on the site for 25 years from the date of notification, as stipulated under Condition 10(a), Schedule 2.

   Note: Under this consent, the Applicant is required to rehabilitate the site and carry out additional undertakings to the satisfaction of the Secretary. Consequently, this consent will continue to apply in all other respects other than the right to conduct quarrying operations until the rehabilitation of the site and those undertakings have been carried out to a satisfactory standard.

6. The Applicant must not undertake quarrying operations below a level of 572 m AHD.

7. The Applicant must not transport more than 2 million tonnes of quarry products from the site in any calendar year.

8. The Applicant must not receive more than 30,000 tonnes of cured concrete waste on the site in any calendar year. The volume of cured concrete waste held on site at any one time must not exceed 2,500 tonnes. No other material classified as waste under the *EPA Waste Classification Guidelines 2014* (or its latest version) may be received on site.

Quarry Product Transport

9. The Applicant must limit laden and unladen truck movements, taken together, as follows:
   (a) where road works required by condition 26 of Schedule 3 of this consent have not been completed to the satisfaction of the relevant roads authorities:
      i. no more than 164, including no more than 25 outbound laden movements on the secondary transport route, per working day (averaged over the working days in each calendar month); and
      ii. a maximum of 320, including a maximum of 38 outbound laden truck movements on the secondary transport route, on any working day;
   (b) until annual quarry production exceeds 1 million tonnes:
      i. no more than 196, including no more than 25 outbound laden movements on the secondary transport route, per working day (averaged over the working days in each calendar month); and
      ii. a maximum of 440, including a maximum of 38 outbound laden truck movements on the secondary transport route, on any working day;

(c) after annual quarry production exceeds 1 million tonnes and until annual quarry production exceeds 1.5 million tonnes:
   i. no more than 292, including no more than 25 outbound laden movements on the secondary transport route, per working day (averaged over the working days in each calendar month); and
   ii. a maximum of 470, including a maximum of 38 outbound laden truck movements on the secondary transport route, on any working day; and

(d) after annual quarry production exceeds 1.5 million tonnes and until and whilever annual quarry production is 2 million tonnes:
   i. no more than 370, including no more than 25 outbound laden movements on the secondary transport route, per working day (averaged over the working days in each calendar month, except for the 2-monthly periods of November/December and January/February, during which it may be averaged over the working days in the relevant 2-monthly period); and
   ii. a maximum of 490, including a maximum of 38 outbound laden truck movements on the secondary transport route, on any working day.

The Applicant must advise the Secretary in writing of the satisfaction of the relevant roads authorities under paragraph (a) above and its intention to undertake truck movements in accordance with the production limits specified in paragraphs (b), (c) or (d) above.

Note: In this condition:
'working day' means any day on which the Applicant may load and despatch trucks (see condition 4 of Schedule 3);
'annual quarry production' means annual quarry production as shown in the production data report to be provided to DRG and the Secretary in condition 17 of schedule 2.

NOTIFICATION OF COMMENCEMENT

10. The Applicant must notify the Department in writing of the date on which it will commence:
   (a) development permitted under this consent, at least 14 days prior to commencing that development; and
   (b) quarrying operations under this consent, at least 14 days prior to commencing those operations.

SURRENDER OF EXISTING DEVELOPMENT CONSENTS

11. Within six months of commencing development under this consent, or as otherwise agreed by the Secretary, the Applicant must surrender the project approval MP 07_0074 for the Gunlake Quarry granted on 24 September 2008, in accordance with the EP&A Regulation.

   Note: This requirement does not extend to the surrender of construction and occupation certificates for existing and proposed building works under Part 4A of the EP&A Act. The surrender of the project approval should not be understood as implying that works legally constructed can no longer be legally maintained or used.

12. Following the commencement of development under this consent, the conditions of this consent shall prevail to the extent of any inconsistency with the conditions of project approval MP 07_0074.

STRUCTURAL ADEQUACY

13. The Applicant 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 4A of the EP&A Act, the Applicant is required to obtain construction and occupation certificates for the proposed building works; and*
   - *Part 8 of the EP&A Regulation sets out the requirements for the certification of the development or project.*

DEMOLITION

14. The Applicant must ensure that all demolition work is carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures*, or its latest version.

PROTECTION OF PUBLIC INFRASTRUCTURE

15. Unless the Applicant and the applicable authority agree otherwise, the Applicant must:
   (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the development; and

(b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the development.

Note: This condition does not apply to damage to roads caused as a result of general road usage or otherwise addressed by contributions required by condition 21 of Schedule 2.

OPERATION OF PLANT AND EQUIPMENT

16. The Applicant must ensure that all the plant and equipment used at the site is:
    (a) maintained in a proper and efficient condition; and
    (b) operated in a proper and efficient manner.

PRODUCTION DATA

17. The Applicant must:
    (a) provide annual quarry production data to DRG and the Secretary using the standard form for that purpose; and
    (b) include a copy of this data in the Annual Review.

IDENTIFICATION OF APPROVED EXTRACTION LIMITS

18. Prior to commencing quarrying operations under this consent, the Applicant must:
    (a) engage a registered surveyor to mark out the boundaries of the approved disturbance area; and
    (b) submit a survey plan of these boundaries with applicable GPS coordinates to the Secretary.

19. While quarrying operations are being carried out, the Applicant must ensure that the boundaries of the approved disturbance areas are clearly marked at all times in a manner that allows operating staff to clearly identify these approved limits.

20. The Applicant must ensure that:
    (a) no quarrying operations take place outside the approved disturbance area; and
    (b) the haul road between the extraction area and western overburden emplacement area is clearly marked at all times, has the minimum width required for safe hauling operations, and includes erosion and sedimentation measures to minimise impacts from the use of the road on Chapmans Creek.

Note: The approved disturbance area includes the extraction area, the overburden emplacement areas, the infrastructure area, haul roads and ancillary areas required to carry out the development.

CONTRIBUTIONS TO COUNCIL

21. The Applicant must pay to Council an annual financial contribution toward the maintenance of Council-owned roads along its primary and secondary transport routes. The contribution must be determined in accordance with the *Goulburn Mulwaree s94 Development Contributions Plan 2009*, or any subsequent relevant contributions plan adopted by Council.

22. Following commencement of development under this consent, the contribution must be paid to Council within one month of the anniversary of the date of this consent each year and reported in the Annual Review.

SCHEDULE 3
ENVIRONMENTAL PERFORMANCE CONDITIONS

NOISE

Acquisition upon Request

1. Upon receiving a written request from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with condition 5 of Schedule 4.

Table 1: Land subject to acquisition upon request

Acquisition Basis	***Land***
Noise	R2

Note: The location of the residence referred to in Table 1 is shown on the figure in Appendix 3.

Additional Mitigation upon Request

2. Upon receiving a written request from the owner of any residence listed in Table 2, the Applicant must implement additional mitigation measures at the residence, in consultation with the landowner.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	***Residence***
Noise	R2, R7

Note: The location of the residences referred to in Table 2 is shown on the figure in Appendix 3.

These measures must be reasonable and feasible, and directed towards reducing the noise impacts of the development on the residence. Mitigation may include measures such as double-glazing, insulation and/or air conditioning.

If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Enclosure of Primary Crusher

3. The Applicant must achieve at least a 5 dB(A) reduction in the measured sound power level of the primary crusher by enclosing the primary crusher within two months of commencing development under this consent and prior to operating the primary crusher outside the hours of 7 am to 6 pm Monday to Saturday.

The Applicant must engage a suitably qualified and experienced acoustical practitioner to measure the sound power level of the primary crusher before and after constructing the enclosure to demonstrate that the enclosure has resulted in a 5 dB(A) sound power level reduction. A report from the acoustical practitioner must be provided to the Secretary within 30 days of constructing the enclosure.

Hours of Operation

4. The Applicant must comply with the operating hours set out in Table 3.

Table 3: Operating Hours

Activity	***Permissible Hours***
Construction	• 7 am to 6 pm Monday to Friday • 8 am to 1 pm Saturday • At no time on Sunday or public holidays
Blasting	• 9 am to 5 pm Monday to Friday • At no time on Saturday, Sunday or public holidays
Quarrying operations (excluding overburden removal/emplacement and drilling)	• 24 hours a day but not between 6 pm Saturday and 2 am Monday • At no time on Sunday or public holidays
Overburden removal/emplacement and drilling	• 7 am to 6 pm Monday to Saturday • At no time on Sunday or public holidays
Loading and dispatching	• 24 hours a day but not between 6 pm Saturday and 2

	am Monday • At no time on Sunday or public holidays
Transportation on the primary transport route	• 24 hours a day but not between 6 pm Saturday and 2 am Monday • At no time on Sunday or public holidays
Transportation on the secondary transport route	• 6 am to 7 pm Monday to Saturday • At no time on Sunday or public holidays
Maintenance	• At any time provided that the activity is not audible at any privately-owned residence

5. The following activities may be carried out on the site outside the hours specified in condition 4:
   (a) delivery or dispatch of materials as requested by Police or other authorities; and
   (b) emergency work to avoid the loss of lives, property and/or to prevent environmental harm.

   In such circumstances, the Applicant must notify the Secretary and affected residents prior to undertaking the activities, or as soon as is practical thereafter.

Noise Impact Assessment Criteria

6. The Applicant must ensure that operational noise generated by the development does not exceed the criteria in Table 4 at any residence on privately-owned land.

Table 4: Noise criteria dB(A)

Receiver	***Day*** $L_{Aeq\ (15\ minute)}$	***Evening*** $L_{Aeq\ (15\ minute)}$	***Night***	
			$L_{Aeq\ (15\ minute)}$	$L_{A1\ (1\ minute)}$
R7	38	38	38	45
R8	37	37	37	45
All other privately-owned residences	35	35	35	45

Note: Receiver locations referred to in Table 4 are shown on the figure in Appendix 3

Noise generated by the development is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the *NSW Industrial Noise Policy*. Appendix 4 sets out the meteorological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.

However, the noise criteria in Table 4 do not apply if the Applicant has an agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

Operating Conditions

7. The Applicant must:
   (a) implement best practice management to minimise the construction, operational and road transportation noise of the development, particularly during the evening and night periods;
   (b) minimise the noise impacts of the development during meteorological conditions when the noise criteria in this consent do not apply (see Appendix 4);
   (c) carry out quarterly attended noise monitoring, unless otherwise agreed by the Secretary, to determine whether the development is complying with the relevant conditions of this consent; and
   (d) regularly assess noise monitoring data and modify and/or stop operations on site to ensure compliance with the relevant conditions of this consent,

   to the satisfaction of the Secretary.

   Note: Required frequency of noise monitoring may be reduced if approved by the Secretary.

Noise Management Plan

8. The Applicant must prepare a Noise Management Plan for the development to the satisfaction of the Secretary. This plan must:
   (a) be prepared in consultation with the EPA;
   (b) be submitted to the Secretary within six months of commencing development under this consent and prior to commencing quarrying operations under this consent;
   (c) describe the measures that would be implemented to ensure:
      • compliance with the noise criteria in this consent;
      • best practice noise management is being employed;

- noise impacts of the development are minimised during meteorological conditions under which the noise criteria in this consent do not apply (see Appendix 4); and
- best practice management is being employed to minimise the noise impacts on the primary transport route and the secondary transport route;

(d) describe the proposed noise management system; and

(e) include a monitoring program to be implemented to measure noise from the development against the noise criteria in Table 4, and which evaluates and reports on the effectiveness of the noise management system on site.

The Applicant must implement the Noise Management Plan as approved by the Secretary.

Traffic Noise Compliance Assessment

9. A noise compliance assessment of the traffic noise impacts of the project must be undertaken within two months of annual dispatches of quarry products exceeding 1 million, 1.5 million and 1.9 million tonnes. The assessment must be conducted by a suitably qualified and experienced acoustical practitioner and must assess compliance of the traffic noise impacts against the predictions in the EIS and relevant road noise criteria. The traffic noise compliance assessment reports must be provided to the Department within 1 month of each assessment.

BLASTING

Blasting Impact Assessment Criteria

10. The Applicant must ensure that blasting on site does not cause any exceedance of the criteria in Table 5.

Table 5: Blasting Criteria

Receiver	***Airblast overpressure (dB(Lin Peak))***	***Ground vibration (mm/s)***	***Allowable exceedance***
Any residence on privately-owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months

However, these criteria do not apply if the Applicant has a written agreement with the relevant owner to exceed the limits in Table 3, and the Applicant has advised the Department in writing of the terms of this agreement.

Blasting Frequency

11. The Applicant may carry out a maximum of 2 blasts per week, unless an additional blast is required following a blast misfire. This condition does not apply to blasts required to ensure the safety of the quarry or workers on site.

Note: For the purposes of this condition, a blast refers to a single blast event, which may involve a number of individual blasts fired in quick succession in a discrete area of the quarry.

Operating Conditions

12. During blasting operations, the Applicant must:

(a) implement best practice management to:
- protect the safety of people and livestock in the areas surrounding blasting operations;
- protect public or private infrastructure/property in the surrounding area from damage from blasting operations and
- minimise the dust and fume emissions of blasting;

(b) operate a suitable system to enable the local community to get up-to-date information on the proposed blasting schedule on site;

(c) co-ordinate the timing of blasting on site with the timing of blasting at Johnniefelds quarry and Lynwood quarry to minimise potential cumulative blasting impacts of the three quarries; and

(d) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent,

to the satisfaction of the Secretary.

Blast Management Plan

13. The Applicant must prepare a Blast Management Plan for the development to the satisfaction of the Secretary. This plan must:

(a) 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;
(b) describe the measures that would be implemented to ensure compliance with the blast criteria and operating conditions of this consent;
(c) include measures to manage flyrock;
(d) include a monitoring program for evaluating and reporting on compliance with the blasting criteria in this consent;
(e) include a protocol for investigating and responding to complaints; and.
(f) include community notification procedures for blasting, which includes:
  (i) a notification process to alert any resident who registers an interest in the blasting schedule to be notified at least 24 hours in advance of each blast;
  (ii) a blasting hotline, or alternative system agreed to by the Secretary, to enable the public to obtain up-to-date information on blasting operations; and
  (iii) information on how the public will be kept informed of the hotline, or any alternative system.

The Applicant must implement the Blast Management Plan as approved by the Secretary.

AIR QUALITY

Air Quality Impact Assessment Criteria

14. The Applicant must 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 in Table 6 at any residence on privately-owned land.

Table 6: Air quality criteria

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	
[c] Deposited dust	Annual	[b] 2 g/m^2/month	[a,d] 4 g/m^2/month

Notes to Table 6:
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 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.

Operating Conditions

15. The Applicant must:
(a) implement best practice management to minimise the dust emissions of the development;
(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;
(c) minimise the air quality impacts of the development during adverse meteorological conditions and extraordinary events (see note d under Table 6);
(d) monitor and report on compliance with the relevant air quality conditions in this consent; and
(e) minimise the area of surface disturbance and undertake progressive rehabilitation of the site,
to the satisfaction of the Secretary.

Air Quality Management Plan

16. The Applicant must prepare an Air Quality Management Plan for the development to the satisfaction of the Secretary. This plan must:
(a) be prepared in consultation with the EPA;

(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;
(c) describe the measures that would be implemented to ensure:
- compliance with the relevant conditions of this consent;
- best practice management is being employed; and
- the air quality impacts of the development are minimised during adverse meteorological conditions and extraordinary events;

(d) describe the proposed air quality management system, including a minimum of two High Volume Air Samplers in locations agreed to by the EPA;
(e) include an air quality monitoring program that:
- is capable of evaluating the performance of the development;
- includes a protocol for determining any exceedances of the relevant conditions of consent;
- effectively supports the air quality management system; and
- evaluates and reports on the adequacy of the air quality management system.

The Applicant must implement the Air Quality Management Plan as approved by the Secretary.

Quarry-owned Land

17. The Applicant must 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 in Table 6 at any occupied residence on quarry-owned land unless:
(a) the tenant has been notified of any health risks associated with such exceedances in accordance with the notification requirements under Schedule 4 of this consent; and
(b) the tenant of any land owned by the Applicant can terminate their tenancy agreement without penalty at any time, subject to giving reasonable notice,
to the satisfaction of the Secretary.

Meteorological Monitoring

18. For the life of the development, the Applicant must ensure that there is a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline.

Greenhouse Gas Emissions

19. The Applicant must implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site.

SOIL AND WATER

Water Supply

20. The Applicant must ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of operations under the consent to match its available water supply, to the satisfaction of the Secretary.

Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Applicant is required to obtain all necessary water licences for the development.

Water Discharges

21. The Applicant must comply with the discharge limits in any EPL, or with section 120 of the POEO Act.

Soil and Water Management Plan

22. The Applicant must prepare a Soil and Water Management Plan for the development to the satisfaction of the Secretary. This plan must:
(a) be prepared by suitably qualified and experienced person/s approved by the Secretary;
(b) be prepared in consultation with the EPA, WaterNSW and DPI Water;
(c) 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;
(d) include a:
(i) Site Water Balance that includes:
- details of:
  - sources and security of water supply;
  - water use and management on site;

- any off-site water transfers; and
- reporting procedures; and

- measures that would be implemented to minimise clean water use on site;

(ii) Erosion and Sediment Control Plan that:

- is consistent with the requirements of the Landcom's *Managing Urban Stormwater: Soils and Construction* manual;
- identifies activities that could cause soil erosion and generate sediment;
- describes measures to minimise soil erosion and the potential for the transport of sediment to downstream waters, including for the haul road between the extraction area and the western emplacement area;
- describes the location, function, and capacity of erosion and sediment control structures, including for the haul road between the extraction area and the western emplacement area; and
- describes what measures would be implemented to maintain (and if necessary decommission) the structures over time.

(iii) Surface Water Management Plan, that includes:

- detailed baseline data on surface water flows and quality in water bodies that could potentially be affected by the development;
- surface water impact assessment criteria;
- a protocol for managing any exceedances of the surface water impact assessment criteria;
- a detailed description of the surface water management system on site including the:
  - clean water diversion system;
  - dirty water management system;
  - water storages, including their capacity to contain dirty water during flood events;
  - irrigation areas; and
  - design of creek and stream crossings; and
- a program to monitor and report on:
  - the effectiveness of the water management system in ensuring that the development has a neutral or beneficial effect on downstream receiving waters;
  - channel stability of the watercourses on the site;
  - surface water flows and quality in watercourses on the site;
  - surface water discharges from the site, including provisions for sampling of water quality during discharge events;
  - the impact of the irrigation areas on water quality;
- details of the on-site waste water management system, including the effluent disposal area, that demonstrates there is adequate capacity for the wastewater loads generated by the development;

(iv) Groundwater Management Plan that includes:

- detailed baseline data on groundwater levels, flows and quality in the region;
- groundwater impact assessment criteria for monitoring bores;
- a program to monitor:
  - groundwater levels and quality on the site;
  - the impacts of the development on any groundwater dependent ecosystems;
  - the impacts of the development on any groundwater bores, springs and seeps on privately-owned land; and
- a protocol for the investigation of identified exceedances of the groundwater impact assessment criteria.

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

TRANSPORT

Monitoring of Product Transport

23. The Applicant must keep accurate records of all truck movements to and from the site (including time of arrival and dispatch) and publish a summary of records, which includes daily maximum and calendar month averages, on its website every 6 months.

Note: See condition 9 of Schedule 2 for the relevant daily maximum and monthly averages.

Operating Conditions

24. The Applicant must:
    (a) ensure that all laden trucks entering or exiting the site have their loads covered, with the exception of loads consisting solely of boulders greater than one tonne in weight;

(b) ensure that all laden trucks exiting the site are cleaned of material that may fall on the road, before leaving the site; and
(c) use its best endeavours to ensure that appropriate signage is displayed on all trucks used to transport quarry product from the development so they can be easily identified by road users.

Traffic Management Plan

25. The Applicant must prepare a Traffic Management Plan for the development to the satisfaction of the Secretary. This plan must:
(a) be prepared in consultation with the RMS and Council;
(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;
(c) describe the measure that would be implemented to avoid dispatching and/or receiving large groups or convoys of laden trucks from the site onto public roads;
(d) include a Drivers' Code of Conduct as required under condition 28 of Schedule 3;
(e) describe the measures that would be put in place to ensure compliance with the Drivers' Code of Conduct; and
(f) include measures to minimise the transmission of dust and tracking of material onto the surface of the public road from vehicles leaving the quarry.

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

Primary Transport Route

26. Prior to transporting more than 62,500 tonnes per calendar month of quarry products from the site, either under this consent or under this consent in combination with MP 07_0074 (while ever it has not been surrendered), the Applicant must implement and complete:

(a) **Red Hills Road and Hume Highway intersection works** - construct an additional 500m long (including taper) left turn northbound acceleration lane at the intersection of Red Hills Road and the Hume Highway in accordance with the relevant Austroads intersection design requirements and to the satisfaction of the Secretary and RMS; and

(b) **Brayton Road and Quarry Access Road intersection works** - upgrade the intersection of the quarry access road with Brayton Road in accordance with Austroads intersection design requirements, to the satisfaction of the local roads authority including carrying out the following:
(i) laying asphalt; and
(ii) constructing an acceleration lane on Brayton Road for truck traffic turning right from the Quarry Access Road onto Brayton Road, to be located south of the quarry intersection, and starting at the intersection.

(c) **General Road Upgrade Works**- the primary transport route shall be upgraded such that it conforms with current Austroads standards and is generally in accordance with the plans entitled Primary Transport Route Road Upgrade Plans prepared by EMM dated 29 June 2017, Map 1 - 39. Detailed road works plans, including relevant supportive calculations and modelling, shall be submitted to the local roads authority for approval, which outlines the extent of works to be undertaken. The applicant must:
(i) Obtain a survey of the primary transport route from a registered surveyor of the entire road corridor. This should show road corridor boundaries, sealed and unsealed pavement extents, line markings, signage, hazards, driveways and intersections, shoulders and any significant vegetation within the corridor that would be affected by the road upgrade works. The survey shall include sufficient detail to indicate the levels and grades of existing pavement, shoulder and clear zone areas.
(ii) The design plans shall show the full extent of works, including at a minimum, earthworks, road widening, shoulders and clear zones, stopping areas, bus bays, drainage, line marking, pavement upgrades, signage and vegetation to be removed or retained. The design plans shall include long-sections of roads and the drainage system, and representative road cross-sections which identify the extent of upgrade works.
(iii) The design plans shall demonstrate that 3.1 m wide lanes are provided along the primary transport route.
(iv) The design plans shall demonstrate that 1.5 m wide shoulders, with 0.5 m width being sealed, are provided along the primary transport route. Where this is not achieved, alternative measures are to be provided, and justification is to be given which

demonstrates that the non-compliance does not result in an unacceptable road safety outcome.

(v) The design plans shall demonstrate that 3.0 m wide clear zones are provided along the primary transport route. Where this is not achieved, alternative measures are to be provided generally in accordance with the plans entitled Primary Transport Route Road Upgrade Plans prepared by EMM dated 29 June 2017, Map 1 - 39.

(vi) The design plans must identify all trees and native vegetation that need to be removed as a part of the works. Lawful approval for any vegetation removal must be provided to the local roads authority prior to the removal of any vegetation in association with the road works.

(vii) A geotechnical report shall be provided to the local roads authority in respect of existing road pavement conditions, pavement carrying capacity, and requirements to upgrade the pavement to accommodate the increase in truck traffic. The geotechnical report shall document the existing pavement by way of borehole and strength testing, at a sampling frequency that will adequately characterise the existing pavement.

(viii) A drainage design shall be submitted as a part of the road works plans. This will include relevant calculations and modelling of the road drainage system, and document the extent of drainage works required for the works. The drainage design shall be undertaken such that there will be no detrimental impact on the drainage system within the road corridor, on adjoining properties, or local vegetation.

(ix) The design plans shall be certified by suitably qualified civil engineer to be compliant with Austroads standards.

(d) **In addition to the matters specified in (c) above, in respect of the primary transport route** - carry out road safety upgrades generally in accordance with the plans entitled Primary Transport Route Road Upgrade Plans prepared by EMM dated 29 June 2017, Map 1 – 39, and subject to any requirements or variations requested by Council as the roads authority including:

(i) line-marking and signage along the primary transport route, including by:
- marking hidden driveways;
- upgrade line markings and increase signage; and
- following discussions and agreement with Council, any upgrades required to improve school bus stop safety.

(ii) installing centre double white line-marking with retroreflective pavement markers along the full length (or along such sections as are otherwise required by Council) of the primary transport route, to prevent overtaking;

(iii) installing edge line-marking on pavement edges with retroreflective pavement markers along the full length (or along such sections as are otherwise required by the Council) of the primary transport route;

(iv) carrying out an analysis of the frequency of heavy fogs on the primary transport route within a 1 month period and in consultation with the Council;

(v) installing guide posts and spacings along appropriate sections of the primary transport route in consultation with the Council. The guide post spacing is to be determined on the basis of the analysis of the frequency of heavy fogs to be prepared by the Applicant as per condition (d)(iv).

(e) Any application to Council under s138 of the Roads Act 1993 for the Primary Transport Route upgrade works is to be in accordance with the plans entitled Primary Transport Route Road Upgrade Plans prepared by EMM dated 29 June 2017, Map 1 – 39, and a copy of such application is to be provided to the Secretary no later than 2 working days after its lodgement with Council.

Note: 62,500 tonnes per calendar month is the monthly equivalent of 750,000 tonnes per annum, the consented limit under project approval MP 07_0074.

27. The Applicant must install and operate a video camera at the intersection of Red Hills Road and the Hume Highway, to the satisfaction of the Secretary. The Applicant must install the camera prior to commencing quarrying operations under this consent and operate the camera until the Hume Highway intersection acceleration lane is constructed and fully operational. The camera must be located in a fixed position with a field of view that accurately records heavy vehicles (including truck identification numbers) merging from Red Hills Road to travel north along the Hume Highway. Recordings from the camera must be examined weekly by the Applicant to ensure safe merging practices at the intersection, securely stored for at least 60 days and made available to the Department and RMS on request.

Truck Driver Code of Conduct

28. Prior to transporting more than 62,500 tonnes per calendar month of quarry products from the site, the Applicant must prepare a Truck Driver Code of Conduct and submit it to the Secretary for approval. The Truck Driver Code of Conduct is to:
    (a) require induction of all truck drivers, including a requirement to read the Truck Driver Code of Conduct and sign a Truck Driver Induction Form, prior to commencing truck driving duties to and from the site;
    (b) include all speed restrictions for the primary transport route and secondary transport route in the Truck Driver Induction Forms;
    (c) incorporate provisions regarding anti-social behaviour and anti-littering practices;
    (d) incorporate details of the safe and quiet driving practices that must be used by drivers transporting products to and from the quarry (particularly on the primary and secondary transport routes) and on safe merging practices at the intersection of Red Hills Road and the Hume Highway;
    (e) incorporate provisions prohibiting overtaking moving vehicles on the primary transport route and secondary transport route;
    (f) incorporate provisions prohibiting the use of air brakes by in-bound trucks at the Red Hills and Hume Highway intersection (except in the case of emergencies) and include provisions for truck drivers to be educated regarding the acceptable use of air brakes on local roads;
    (g) include a copy of the Applicant's drug and alcohol policy; and
    (h) incorporate mechanisms for ensuring compliance with the Truck Driver Code of Conduct including a mechanism for the Applicant's onsite manager to conduct random compliance checks (no less than once per quarter) of driver behaviour along the primary transport route and secondary transport route.

Transport Options Review

29. Within 10 years of commencing development under this consent, and every 10 years thereafter, the Applicant must commission, commence and pay the full cost of a Transport Options Review for the development. This review must:
    (a) be conducted by a suitably qualified, experienced and independent expert/s whose appointment has been endorsed by the Secretary;
    (b) include detailed consultation with Transport for NSW, RMS and Council;
    (c) review the economic, social and environmental costs and benefits of all reasonable and feasible options for the transport of quarry products from the site (including by rail and including trucks movements currently permitted by this consent);
    (d) recommend any appropriate measures or actions to reduce the economic, social and environmental costs associated with transport of quarry products from the site, and
    (e) be conducted and reported to the satisfaction of the Secretary.

    Within 12 weeks of commencing this review or as otherwise agreed by the Secretary, the Applicant must submit a copy of the review report to the Secretary and any other NSW agency that requests it, together with its response to any recommendations contained in the review report.

ABORIGINAL HERITAGE

Aboriginal Heritage Management Plan

30. The Applicant must prepare an Aboriginal Heritage Management Plan for the development to the satisfaction of the Secretary. The plan must:

    (a) be prepared by suitably qualified and experienced persons whose appointment has been endorsed by the Secretary;
    (b) be prepared in consultation with OEH and the Registered Aboriginal Parties;
    (c) 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; and
    (d) include a description of the measures that would be implemented to:
        (i) protect, monitor and manage known sites of archaeological significance;
        (ii) manage any new Aboriginal objects or relics that are discovered;
        (iii) store Aboriginal heritage items salvaged on site; and
        (iv) ensure ongoing consultation and involvement of the Registered Aboriginal Parties in the conservation and management of Aboriginal cultural heritage on the site.

BIODIVERSITY AND REHABILITATION

Biodiversity Offset Strategy

31. The Applicant must implement the Biodiversity Offset Strategy, including:

(a) protecting, enhancing and maintaining the Biodiversity Areas identified in condition 32 of Schedule 3; and
(b) retiring the biodiversity credits identified in condition 34 of Schedule 3, in accordance with the *Framework for Biodiversity Assessment - NSW Biodiversity Offsets Policy for Major Projects*;

to the satisfaction of the Secretary and OEH.

Biodiversity Areas

32. The Applicant must protect, enhance and maintain the Biodiversity Areas described in Table 7 and shown conceptually on the plan in Appendix 5, to achieve the objectives in Table 7 to the satisfaction of the Secretary and OEH.

Table 7: Biodiversity Areas

Biodiversity Area	***Objective***	***Minimum Size (ha)***
White Box-Yellow Box Blakely's Red Gum Woodland Endangered Ecological Community (Box Gum Woodland EEC)	Protect, maintain and enhance, including through assisted regeneration, Box Gum Woodland EEC on the site	32.66
Cleared land	Regenerate and/or replant cleared land on site with native vegetation representative of Box Gum Woodland EEC	46.16
Total		78.82

Security of Biodiversity Areas

33. Prior to commencing quarrying operations under this consent, unless otherwise agreed with the Secretary, the Applicant must make suitable arrangements to provide long-term security and funding for the Biodiversity Areas identified in condition 32 of Schedule 3, to the satisfaction of the Secretary and OEH.

Note: Mechanisms to provide appropriate long-term security to the Biodiversity Area include a BioBanking Agreement, under the Threatened Species Conservation Act 1995, a Voluntary Conservation Agreement or an alternative mechanism that provides for a similar conservation outcome. Any mechanism must remain in force in perpetuity.

Biodiversity Offsets

34. The Applicant must retire the biodiversity credits set out in Table 8, in accordance with the *Framework for Biodiversity Assessment - NSW Biodiversity Offsets Policy for Major Projects* to the satisfaction of the Secretary and OEH. The credits identified in Table 8 include credits arising from the carrying out of the primary transport route upgrade works referred to in condition 26. If the vegetation to be removed is less than anticipated at the date of this consent the credits arising from these upgrade works may be reduced if approved by the Secretary provided the number of credits does not fall below the minimum number identified in column 2 of the table.

Table 8: Biodiversity credits to be retired

Credit type	***Number of Credits***	***Additional Credits resulting from Primary Transport Route Upgrade Works***
Ecosystem Credits		
Yellow Box - Blakely's Red Gum Grassy Woodland (PCT1330)	373	13
Yellow Box - Blakely's Red Gum Grassy Woodland Derived Native Grassland (PCT1330)	185	
Broad-leaved Peppermint - Red Stringybark grassy open forest (PCT734)	160	23
Broad-leaved Peppermint - Red	662	

Stringybark grassy open forest Derived Native Grassland (PCT734)		
Total	1,380	36

Security of Offsets

35. Within eighteen months of commencing development under this consent, unless otherwise agreed with the Secretary, the Applicant must make suitable arrangements to provide long-term security and funding for the Biodiversity Offset Areas used to retire the credits identified in condition 34 of Schedule 3, through a Biobanking Agreement under the *Threatened Species Conservation Act 1995,* to the satisfaction of OEH.

Rehabilitation Objectives

36. The Applicant must rehabilitate the site to the satisfaction of the Secretary. This rehabilitation must be generally consistent with the rehabilitation strategy in the EIS and must comply with the objectives in Table 9.

Table 9: Rehabilitation Objectives

Feature	***Objective***
Site (as a whole)	• Safe, stable and non-polluting • Final landform integrated with surrounding natural landforms as far as is reasonable and feasible • Final landform has minimal visual impact when viewed from surrounding land
Surface Infrastructure	• Decommissioned and removed, unless otherwise agreed by the Secretary
Land identified as the Biodiversity Area	• Conserved and enhanced with native, endemic vegetation consistent with the objectives shown in Table 7
Riparian corridors along Chapman Creek and its tributaries	• Stabilised and vegetated
Quarry benches	• Landscaped and vegetated using native tree and understorey species
Final Void	• Minimise the size, depth and slope of the batters of the final void • Minimise the drainage catchment of the final void

Progressive Rehabilitation

37. The Applicant must rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim stabilisation measures must be implemented where reasonable and feasible to control dust emissions in disturbed areas that are not active and which are not ready for final rehabilitation.

Note: It is accepted that parts of the site that are progressively rehabilitated may be subject to further disturbance in future.

Biodiversity and Rehabilitation Management Plan

38. The Applicant must prepare a Biodiversity and Rehabilitation Management Plan for the development to the satisfaction of the Secretary. This plan must:

(a) be prepared in consultation with OEH, DPI Fisheries and Council;
(b) be submitted to the Secretary within twelve months of commencing development under this consent and prior to commencing quarrying operations under this consent unless the Secretary agrees otherwise;
(c) provide details of the conceptual final landform and associated land uses for the site;
(d) describe how the implementation of condition 31 of Schedule 3 would be integrated with the overall rehabilitation of the site;
(e) include detailed performance and completion criteria for evaluating performance under condition 31 of Schedule 3 and rehabilitation of the site, including triggers for any necessary remedial action;
(f) describe the short, medium and long term measures that would be implemented to:
    - manage remnant vegetation and habitat, including within the Biodiversity Areas and any areas that would be used to offset the biodiversity credits identified in condition 34 of Schedule 3; and

- ensure compliance with the rehabilitation objectives and progressive rehabilitation obligations in this consent;

(g) include a detailed description of the measures that would be implemented over the next 3 years (to be updated for each 3 year period following initial approval of the plan) including the procedures to be implemented for:
- maximising the salvage of environmental resources within the approved disturbance area, including tree hollows, vegetative and soil resources, for beneficial reuse in the enhancement of the offset area or site rehabilitation;
- restoring and enhancing the quality of native vegetation and fauna habitat in the biodiversity offset and rehabilitation areas through assisted natural regeneration, targeted vegetation establishment and the introduction of fauna habitat features;
- protecting vegetation and fauna habitat outside the approved disturbance area on-site;
- protecting the Chapmans Creek riparian buffer area shown on the figure in Appendix 6 in accordance with the *Policy and Guidelines for Fish Habitat Conservation and Management*;
- minimising the impacts on native fauna, including undertaking pre-clearance surveys;
- establishing vegetation screening to minimise the visual impacts of the site on surrounding receivers;
- ensuring minimal environmental consequences for threatened species, populations and habitats;
- collecting and propagating seed;
- controlling weeds and feral pests;
- controlling erosion; and
- managing bushfire risk;

(h) include a program to monitor and report on the effectiveness of these measures, and progress against the performance and completion criteria;

(i) identify the potential risks to the successful implementation of condition 31 of Schedule 3, and include a description of the contingency measures that would be implemented to mitigate these risks; and

(j) include details of who would be responsible for monitoring, reviewing, and implementing the plan.

The Applicant must implement the Biodiversity and Rehabilitation Management Plan as approved by the Secretary.

Biodiversity and Rehabilitation Bond

39. Within 6 months of the approval of the Biodiversity and Rehabilitation Management Plan, the Applicant must lodge a Biodiversity and Rehabilitation Bond with the Department to ensure that the Biodiversity Offset Strategy and rehabilitation of the site are implemented in accordance with the performance and completion criteria set out in the plan and the relevant conditions of this consent. The sum of the bond must be determined by:
(a) calculating the cost of implementing the Biodiversity Offset Strategy over the next 3 years for the Biodiversity Areas identified in condition 32 of Schedule 3;
(b) calculating the cost of rehabilitating all disturbed areas of the site, taking into account the likely surface disturbance over the next 3 years of quarrying operations; and
(c) employing a suitably qualified quantity surveyor or other expert to verify the calculated costs, or by using the Rehabilitation Cost Estimate spreadsheet tool (RCE) issued by DRG.

to the satisfaction of the Secretary.

Notes:
- *Alternative funding arrangements for long term management of the Biodiversity Offset Strategy, such as provision of capital and management funding as agreed by OEH as part of a BioBanking Agreement, or transfer to conservation reserve estate can be used to reduce the liability of the Biodiversity and Rehabilitation Bond.*
- *If capital and other expenditure required by the Biodiversity and Rehabilitation Management Plan is largely complete, the Secretary may waive the requirement for lodgement of a bond in respect of the remaining expenditure.*
- *If the Biodiversity Offset Strategy and/or rehabilitation of the site area are completed (or partially completed) to the satisfaction of the Secretary, then the Secretary will release the bond (or relevant part of the bond). If the Biodiversity Offset Strategy and rehabilitation of the site are not completed to the satisfaction of the Secretary, then the Secretary will call in all or part of the bond, and arrange for the completion of the relevant works.*

40. Within 3 months of each Independent Environmental Audit (see condition 11 of Schedule 5), the Applicant must review, and if necessary revise, the sum of the Biodiversity and Rehabilitation Bond to the satisfaction of the Secretary. This review must consider the:
(a) effects of inflation;
(b) likely cost of implementing the Biodiversity Offset Strategy and rehabilitating all disturbed areas of the site (taking into account the likely surface disturbance over the next 3 years of the development); and

(c) performance of the implementation of the Biodiversity Offset Strategy and rehabilitation of the site to date.

VISUAL

41. The Applicant must implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the development to the satisfaction of the Secretary.

WASTE

42. The Applicant must:
(a) manage on-site sewage treatment and disposal in accordance with the requirements of its EPL, and to the satisfaction of the EPA and Council;
(b) minimise the waste generated by the development;
(c) ensure that the waste generated by the development is appropriately stored, handled, and disposed of; and
(d) report on waste management and minimisation in the Annual Review,
to the satisfaction of the Secretary.

43. Except as expressly permitted in an EPL, the Applicant must not receive waste (with the exception of the cured concrete transported to the site in accordance with condition 8 of Schedule 2) at the site for storage, treatment, processing, reprocessing or disposal.

LIQUID STORAGE

44. The Applicant must ensure that all tanks and similar storage facilities (other than for water) are protected by appropriate bunding or other containment, in accordance with the relevant Australian Standards.

DANGEROUS GOODS

45. The Applicant must ensure that the storage, handling, and transport of dangerous goods is done in accordance with the relevant Australian Standards, particularly AS1940 and AS1596, and the *Dangerous Goods Code.*

BUSHFIRE

46. The Applicant must:
    (a) ensure that the development is suitably equipped to respond to any fires on site; and
    (b) assist the Rural Fire Service and emergency services as much as possible if there is a fire in the vicinity of the site.

SCHEDULE 4
ADDITIONAL PROCEDURES

NOTIFICATION OF LANDOWNERS

1. Within 2 months of the commencement of development under this consent, the Applicant must notify in writing the owner of:
   (a) the residences listed in Table 2 of Schedule 3 that they are entitled to ask the Applicant to install additional noise mitigation measures at the residences; and
   (b) notify any tenants of quarry-owned land of their rights under this consent.

2. Prior to entering into any tenancy agreement for any land owned by the Applicant that is predicted to experience exceedances of the recommended dust and/or noise criteria, the Applicant must:
   (a) advise the prospective tenants of the potential health and amenity impacts associated with living on the land, and give them a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time); and
   (b) advise the prospective tenants of the rights they would have under this consent,
   to the satisfaction of the Secretary.

3. As soon as practicable after obtaining monitoring results showing:
   (a) an exceedance of any relevant criteria in Schedule 3, the Applicant must notify the affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the development is again complying with the relevant criteria; and
   (b) an exceedance of any relevant air quality criteria in Schedule 3, the Applicant must send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and current tenants of the land (including the tenants of land which is not privately-owned).

INDEPENDENT REVIEW

4. If an owner of privately-owned land considers the development to be exceeding the relevant criteria in Schedule 3, then he/she may ask the Secretary in writing for an independent review of the impacts of the development on his/her land.

   If the Secretary is satisfied that an independent review is warranted, then within 2 months of the Secretary's decision, the Applicant must:
   (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to:
      - consult with the landowner to determine his/her concerns;
      - conduct monitoring to determine whether the development is complying with the relevant criteria in Schedule 3; and
      - if the development is not complying with these criteria, then identify 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.

LAND ACQUISITION

5. Within 3 months of receiving a written request from a landowner with acquisition rights, the Applicant must make a binding written offer to the landowner based on:
   (a) the current market value of the landowner's interest in the land at the date of this written request, as if the land was unaffected by the development, having regard to the:
      - existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and
      - presence of improvements on the land and/or any approved building or structure which has been physically commenced at the date of the landowner's written request, and is due to be completed subsequent to that date, but excluding any improvements that have resulted from the implementation of the additional noise mitigation measures in condition 2 of Schedule 3;
   (b) the reasonable costs associated with:
      - relocating within the Goulburn Mulwaree local government area, or to any other local government area determined by the Secretary; and
      - obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is to be acquired; and
   (c) reasonable compensation for any disturbance caused by the land acquisition process.

   However, if at the end of this period, the Applicant and landowner cannot agree on the acquisition price of the land and/or the terms upon which the land is to be acquired, then either party may refer the matter to the Secretary for resolution.

Upon receiving such a request, the Secretary will request the President of the NSW Division of the Australian Property Institute to appoint a qualified independent valuer to:

- consider submissions from both parties;
- determine a fair and reasonable acquisition price for the land and/or the terms upon which the land is to be acquired, having regard to the matters referred to in paragraphs (a)-(c) above;
- prepare a detailed report setting out the reasons for any determination; and
- provide a copy of the report to both parties.

Within 14 days of receiving the independent valuer's report, the Applicant must make a binding written offer to the landowner to purchase the land at a price not less than the independent valuer's determination.

However, if either party disputes the independent valuer's determination, then within 14 days of receiving the independent valuer's report, they may refer the matter to the Secretary for review. Any request for a review must be accompanied by a detailed report setting out the reasons why the party disputes the independent valuer's determination. Following consultation with the independent valuer and both parties, the Secretary will determine a fair and reasonable acquisition price for the land, having regard to the matters referred to in paragraphs (a)-(c) above, the independent valuer's report, the detailed report of the party that disputes the independent valuer's determination and any other relevant submissions.

Within 14 days of this determination, the Applicant must make a binding written offer to the landowner to purchase the land at a price not less than the Secretary's determination.

If the landowner refuses to accept the Applicant's binding written offer under this condition within six months of the offer being made, then the Applicant's obligations to acquire the land shall cease, unless the Secretary determines otherwise.

The Applicant must pay all reasonable costs associated with the land acquisition process described in this condition, including the costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of this plan at the Office of the Registrar-General.

SCHEDULE 5
ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. If the Secretary requires, the Applicant must prepare an Environmental Management Strategy for the development to the satisfaction of the Secretary. This strategy must:
   (a) be submitted to the Secretary for approval within 6 months of the Secretary requiring preparation of the strategy by notice to the Applicant;
   (b) provide the strategic framework for environmental management of the development;
   (c) identify the statutory approvals that apply to the development;
   (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the development;
   (e) describe the procedures that would be implemented to:
      - keep the local community and relevant agencies informed about the operation and environmental performance of the development;
      - receive, record, handle and respond to complaints;
      - resolve any disputes that may arise during the course of the development;
      - respond to any non-compliance;
      - respond to emergencies; and
   (f) include:
      - copies of any strategies, plans and programs approved under the conditions of this consent; and
      - a clear plan depicting all the monitoring to be carried out under the conditions of this consent.

   The Applicant must implement any Environmental Management Strategy as approved by the Secretary.

Management Plan Requirements

2. The Applicant must ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:
   (a) detailed 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 development or any management measures;
   (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
   (d) a program to monitor and report on the:
   - impacts and environmental performance of the development; and
   - effectiveness of any management measures (see (c) above);
   (e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;
   (f) a program to investigate and implement ways to improve the environmental performance of the development 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: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.

Application of Existing Management Plans

3. Prior to the approval of management plans under this consent, the Applicant shall manage development undertaken pursuant to this consent in accordance with any equivalent or similar management plan/s required under project approval MP 07_0074.

Revision of Strategies, Plans & Programs

4. Within 3 months of the:
   (a) submission of an Annual Review;
   (b) submission of an incident report under condition 8 below;
   (c) submission of an audit report under condition 11 below; and
   (d) approval of any modifications to this consent,

   the Applicant must review, and if necessary revise, the strategies, plans, and programs required under this consent to the satisfaction of the Secretary.

   Within 4 weeks of conducting any such review, the Applicant must advise the Secretary of the outcomes of the review, and provide any revised documents to the Secretary for review and approval.

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

Updating and Staging of Strategies, Plans or Programs

5. To ensure that strategies, plans or programs required under this consent are updated on a regular basis, and that they incorporate any appropriate additional measures to improve the environmental performance of the development, the Applicant may at any time submit revised strategies, plans or programs for the approval of the Secretary. With the agreement of the Secretary, the Applicant may also submit any strategy, plan or program required by this consent on a staged basis.

   With the agreement of the Secretary, the Applicant may prepare a revision of or a stage of a strategy, plan or program without undertaking consultation with all parties nominated under the applicable condition in this consent.

   Notes:
   - *While any strategy, plan or program may be submitted on a staged basis, the Applicant will need to ensure that the operations associated with the development are covered by suitable strategies, plans or programs at all times.*
   - *If the submission of any strategy, plan or program is to be staged; then the relevant strategy, plan or program must clearly describe the specific stage/s of the development to which the strategy, plan or program applies; the relationship of this stage/s to any future stages; and the trigger for updating the strategy, plan or program.*

Adaptive Management

6. The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedule 3. Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.

   Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must, at the earliest opportunity:
   (a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not reoccur;
   (b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and
   (c) implement remediation measures as directed by the Secretary;

   to the satisfaction of the Secretary.

COMMUNITY CONSULTATIVE COMMITTEE

7. The Applicant must establish and operate a Community Consultative Committee (CCC) for the development to the satisfaction of the Secretary. The CCC must be operated in general accordance with the Department's *Community Consultative Committee Guidelines for State Significant Projects* (November 2016, or its latest version).

   Note:
   - *The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Applicant complies with this consent.*

REPORTING

Incident Reporting

8. The Applicant must immediately notify the Secretary and any other relevant agencies of any incident. Within 7 days of the date of the incident, the Applicant must provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.

Regular Reporting

9. The Applicant must provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent.

Annual Review

10. By the end of September each year, or other timing as may be agreed by the Secretary, the Applicant must submit a report to the Department reviewing the environmental performance of the development to the satisfaction of the Secretary. This review must:
    (a) describe the development (including any rehabilitation) that was carried out in the previous financial year, and the development that is proposed to be carried out over the current financial year;
    (b) include a comprehensive review of the monitoring results and complaints records of the development over the previous financial year, which includes a comparison of these results against the:
        - relevant statutory requirements, limits or performance measures/criteria;
        - requirements of any plan or program required under this consent;
        - monitoring results of previous years; and
        - relevant predictions in the documents listed in condition 2(a) of Schedule 2;
    (c) identify any non-compliance over the past financial 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 development;
    (e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and
    (f) describe what measures will be implemented over the current financial year to improve the environmental performance of the development.

    The Applicant must ensure that copies of the Annual Review are submitted to Council and the EPA and are available to the Community Consultative Committee (see condition 7 of Schedule 5) and any interested person upon request.

INDEPENDENT ENVIRONMENTAL AUDIT

11. Within a year of commencing development under this consent, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant must commission, commence and pay the full cost of an Independent Environmental Audit of the development. This audit must:
    (f) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;
    (g) include consultation with the relevant agencies;
    (h) assess the environmental performance of the development and whether it is complying with the relevant requirements in this consent and any relevant EPL or necessary water licences for the development (including any assessment, strategy, plan or program required under these approvals);
    (i) review the adequacy of strategies, plans or programs required under the abovementioned approvals;
    (j) recommend appropriate measures or actions to improve the environmental performance of the development, and/or any assessment, strategy, plan or program required under the abovementioned approvals; and
    (k) be conducted and reported to the satisfaction of the Secretary.

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

12. Within 12 weeks of commencing this audit, or as otherwise agreed by the Secretary, the Applicant 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

13. Within 6 months of the commencement of development under this consent, the Applicant must:
    (a) make the following information publicly available on its website:

- the documents listed in condition 2(a) of Schedule 2;
- current statutory approvals for the development, including any environmental protection licence and any permits or approvals under the Roads Act 1993 relating to road upgrades, etc;
- all approved strategies, plans and programs required under the conditions of this consent;
- a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs;
- a complaints register, updated monthly;
- the annual reviews of the development;
- any independent environmental audit, and the Applicant's response to the 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.

APPENDIX 1
DEVELOPMENT LAYOUT

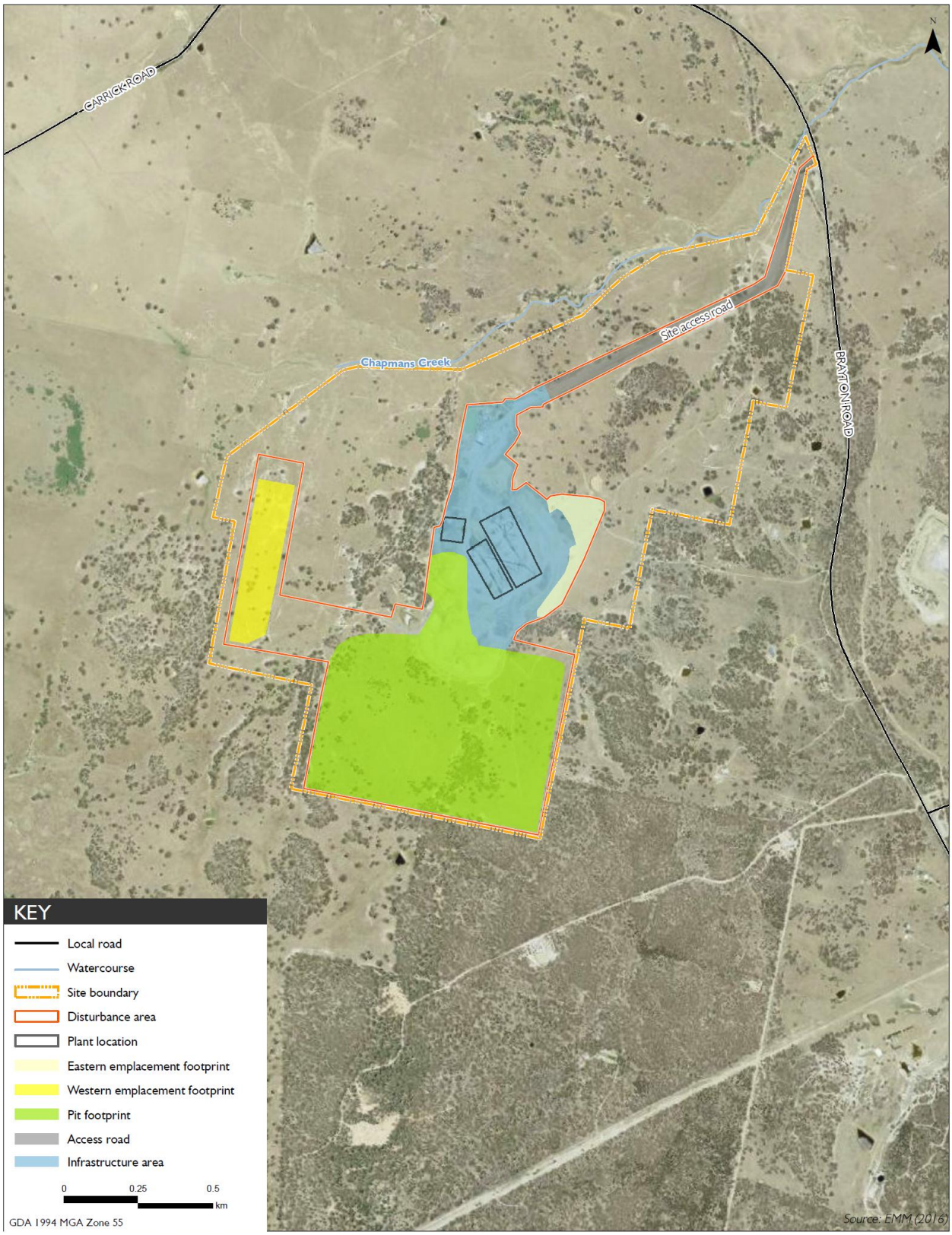


Figure: *Development Layout*

APPENDIX 2
STATEMENT OF COMMITMENTS

Aspect	Commitment
Noise and vibration	*Voluntary land acquisition and mitigation* • Voluntarily acquisition rights will be offered to receiver R2 in accordance with the VLAMP. • Voluntarily mitigation rights will be offered to receiver R2 and R7 in accordance with the VLAMP. *Primary crusher noise attenuation* • The primary crusher will be enclosed as part of the extension project within four months of approval. • The primary crusher will not be operated at night until it is enclosed. *Overburden emplacement* • The overburden emplacement east of the infrastructure area will be extended to the north and south as shown in the general site layout. *Evening and night operation of mobile fleet* • The mobile fleet operations will be reduced during the evening and night periods, as represented in the noise model. *Noise and Blast Management Plan* • An updated Noise and Blast Management Plan will be submitted to DPE within six months of commencing development under the consent.
Air quality	*Air quality monitoring* • 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. *Air quality management* • The following additional management measures will be implemented to enable Gunlake to continue to manage potential air quality impacts effectively: - compliance with the 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 holes 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.

Aspect	Commitment
Biodiversity	*Rehabilitation and Biodiversity Offsets Management Plan [previously the Landscape Management Plan]* • The Rehabilitation and Biodiversity Offsets Management Plan (RBOMP) will be updated to include details on biodiversity management and rehabilitation for the extension project. The plan will be completed and implemented within 12 months of commencing development under the consent. • The RBOMP will include procedures to be applied for the management of the offset properties, the arrangements for conservation in perpetuity and regeneration works to be undertaken. This will include the procedures for: - assisting the revegetation and regeneration in the offset areas, including establishment of canopy, understorey and groundcover in areas of native pasture where required; - controlling weeds and feral pests; - fencing and access arrangements; - erosion control; and - bushfire management. • An offset monitoring program will also be included within the RBOMP to monitor any changes to the condition of the offset areas. *Offsets* • Biodiversity Areas of 78.82 ha will be provided to compensate for the biodiversity impacts of the original approval, as modified. • An offset package with 1,380 ha of biodiversity credits will be provided under a BioBanking agreement to compensate for the additional biodiversity impacts of the extension project. • The offset areas will be managed in accordance with the RBOMP.
Groundwater	*Water management plan* The Water Management (WMP) Plan will be updated to provide details of the surface water management system, surface water management and monitoring for the extended quarry and will be submitted to DPE within six months of commencing development under the consent. The Gunlake water management plan will be updated to include: • triggers values to facilitate the identification of groundwater impacts outside of predictions; • the use of monitoring data to calibrate and update the model at significant project stages; • quarterly groundwater quality and level monitoring to facilitate the early identification of adverse impacts and test model predictions; • monitoring of spring flow in conjunction with the quarterly groundwater level and quality program; • monitoring mapped areas of Box Gum Woodland; • procedures for the re-use of site water; and • response protocols and contingency mitigation measures to be implemented in the event of an unpredicted adverse impact. *Groundwater licensing* • Gunlake Quarry will obtain a WAL(s) for the predicted groundwater take over the lifespan of extension project (up to 37 ML/year). • Groundwater monitoring bores will be registered under the Water Act.
Surface water	*Surface water licensing* • Gunlake will seek any required water licences should water need to be imported during extended dry periods.

Aspect	Commitment
	Surface water monitoring • The current surface water monitoring program will be modified to include monitoring at: - two receiving water sites on Chapmans Creek, downstream of the quarry; and - the Process Water Dam and Pit Dewatering Dam. • Should the monitoring program indicate that the quarry is potentially adversely affecting water quality in Chapmans Creek, Gunlake will undertake an investigation to establish the likely cause and will implement necessary mitigation measures. • The updated Soil and Water Management Plan will include the site water balance and measures to manage water excesses and deficits.
Aboriginal heritage	*Aboriginal Heritage Management Plan* • An updated Aboriginal Heritage Management Plan, prepared in consultation with OEH and Registered Aboriginal Parties, will be submitted to DPE within six months of commencing development under the consent • The Gunlake Quarry Aboriginal Heritage Management Plan (AHMP) will be updated and provide details of: - all Aboriginal sites identified for the project and those previously recorded in the broader project site boundary; - management measures and their progress towards completion; - continuing consultation and involvement of registered Aboriginal parties; - protocols for newly identified sites; - protocols for suspected human skeletal material; and - provisions for review and updates of the AHMP. *Aboriginal sites* • All Aboriginal sites in the project disturbance footprint will be collected by a qualified archaeologist and members of the RAPs and relocated to the same area as previously collected artefacts at the site. • If new Aboriginal sites are discovered outside of known site areas, all work will halt and an archaeologist and members of the RAPs be contacted to determine the significance of the objects. Objects will be managed based on their sensitivity in a manner consistent with the management measures outlined above, including appropriate forms of salvage for the items. • In the event that known or suspected human skeletal remains are encountered during the activity, the procedures detailed in Appendix M of the EIS will be followed. *Avoiding Aboriginal sites* • The Aboriginal sites, GL4, GL12, GL13 and GL15, will be fenced and avoided by the project.
Social	*Local employment, training and engagement* • Gunlake will ensure that preference is given to local employees. Gunlake will use local or regional contractors and suppliers where this presents a cost effective and feasible option. • Gunlake will provide ongoing training and certification opportunities for local community members to ensure they have the necessary skills to work in extractive industries. • Gunlake will continue to actively engage with the local community and affected individuals and groups and address any complaints and feedback on quarry operations.
Soils and rehabilitation	*Rehabilitation scheduling* • Rehabilitation will be progressively staged as soon as possible after final completion of works is determined. Staging of rehabilitation activities will require identification of timelines for decommissioning of pits, buildings and other supporting infrastructure. A more detailed schedule of works will be developed 12 to 24 months prior to the confirmed closure. *Erosion and sediment control* • Erosion and sediment control measures will be defined in an Erosion and Sediment Control Plan to be implemented throughout the life of the project. *Weeds* • Gunlake will take the necessary precautions to prevent excessive development of weeds within rehabilitated areas.

Aspect	Commitment
	Rehabilitation monitoring • Gunlake will undertake an ongoing monitoring program throughout and beyond the operation of the project. Areas being rehabilitated will regularly be inspected and assessed against the short and long-term rehabilitation objectives outlined in EIS Section 6.4.1. • It is envisaged that rehabilitation monitoring will be undertaken for at least 2 years following the completion of all rehabilitation. The exact period would reflect seasonal conditions during that period. In any event, maintenance will continue until such time as the objectives have been achieved. The monitoring criteria will be reviewed and finalised with Goulburn Mulwaree Council at the time of submitting a final rehabilitation plan.
Visual	*Visual amenity* • Gunlake will continue to consult with surrounding landowners regarding the visual amenity of the quarry and will implement any reasonable additional controls to further reduce their visual impact, if necessary.
Historic heritage	*Unexpected finds* • Gunlake will include an unexpected finds protocol in relation to historic heritage as part of the EMS for the quarry.

APPENDIX 3
NOISE RECEIVER LOCATIONS

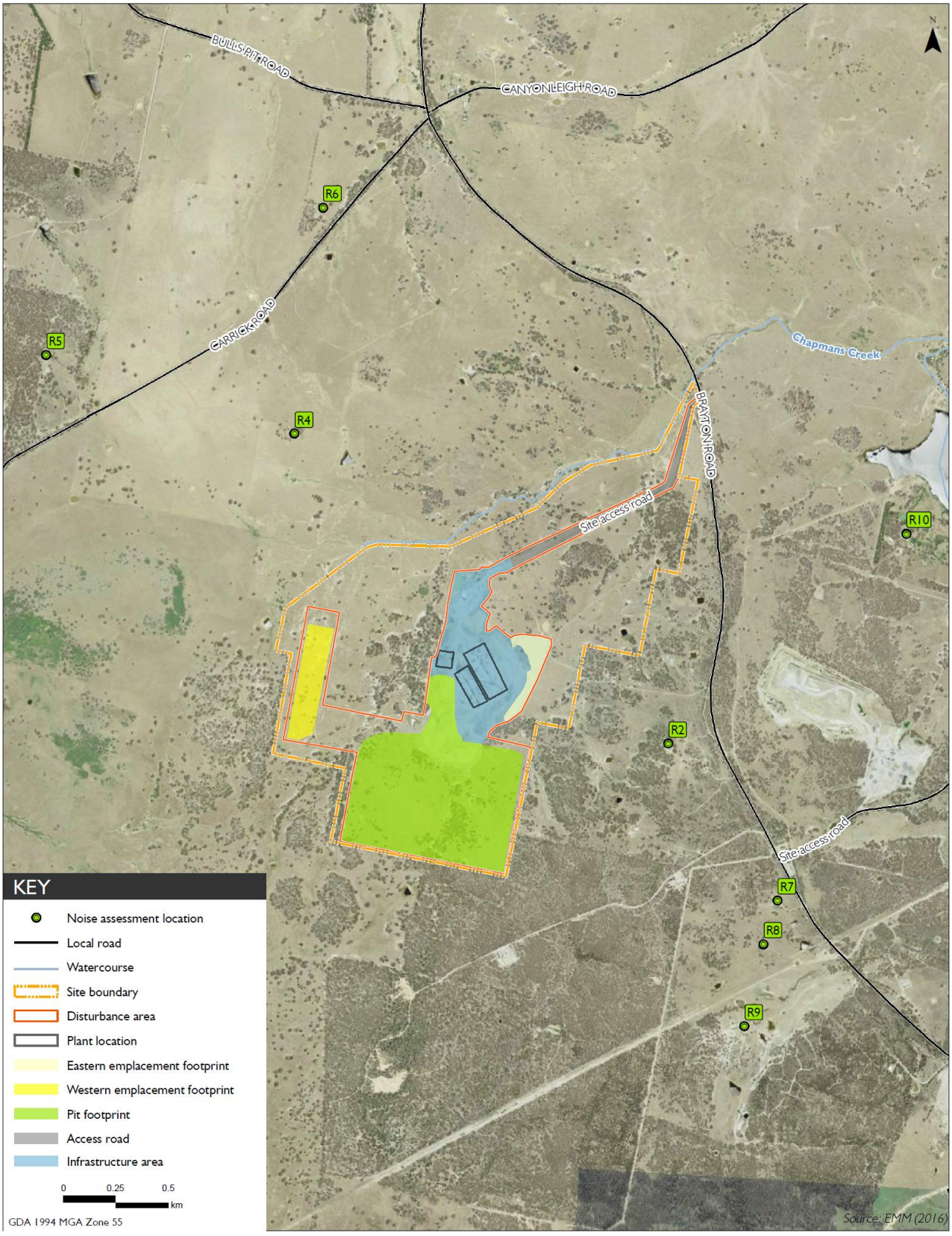


Figure: *Noise Assessment Locations*

APPENDIX 4
NOISE COMPLIANCE ASSESSMENT

Applicable Meteorological Conditions

1. The noise criteria in Table 2 are to apply under all meteorological conditions except the following:
   (a) wind speeds greater than 3 m/s at 10 m above ground level; or
   (b) temperature inversion conditions between 1.5°C and 3°C/100 m and wind speed greater than 2 m/s at 10 m above ground level; or
   (c) temperature inversion conditions greater than 3°C/100 m.

Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station required under condition 18 of Schedule 3.

Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.

4. Unless the Secretary agrees otherwise, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
   (a) monitoring locations for the collection of representative noise data;
   (b) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
   (c) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.

APPENDIX 5
BIODIVERSITY AREAS

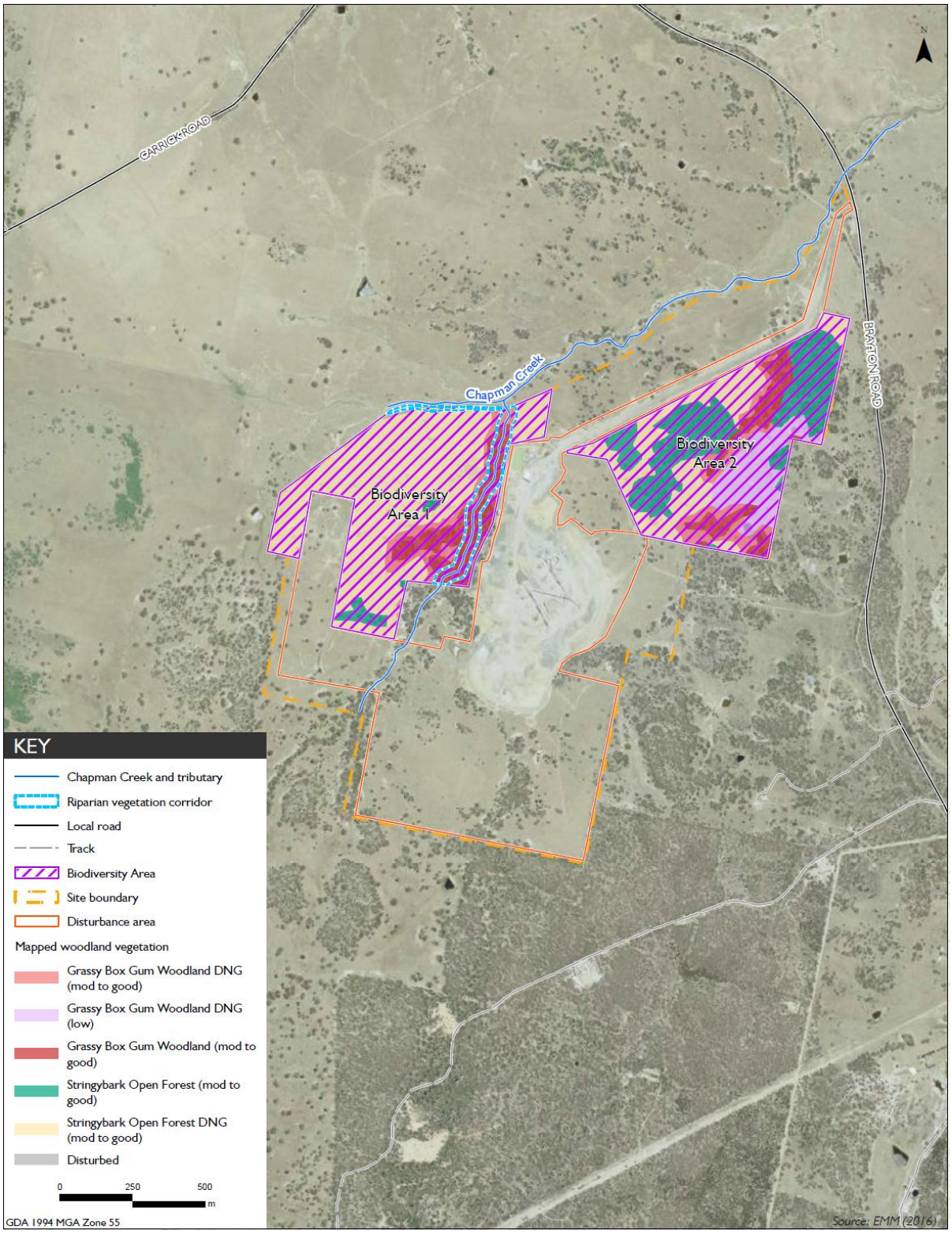


Figure: *Location of Biodiversity Areas*

APPENDIX 6
CHAPMANS CREEK RIPARIAN BUFFER

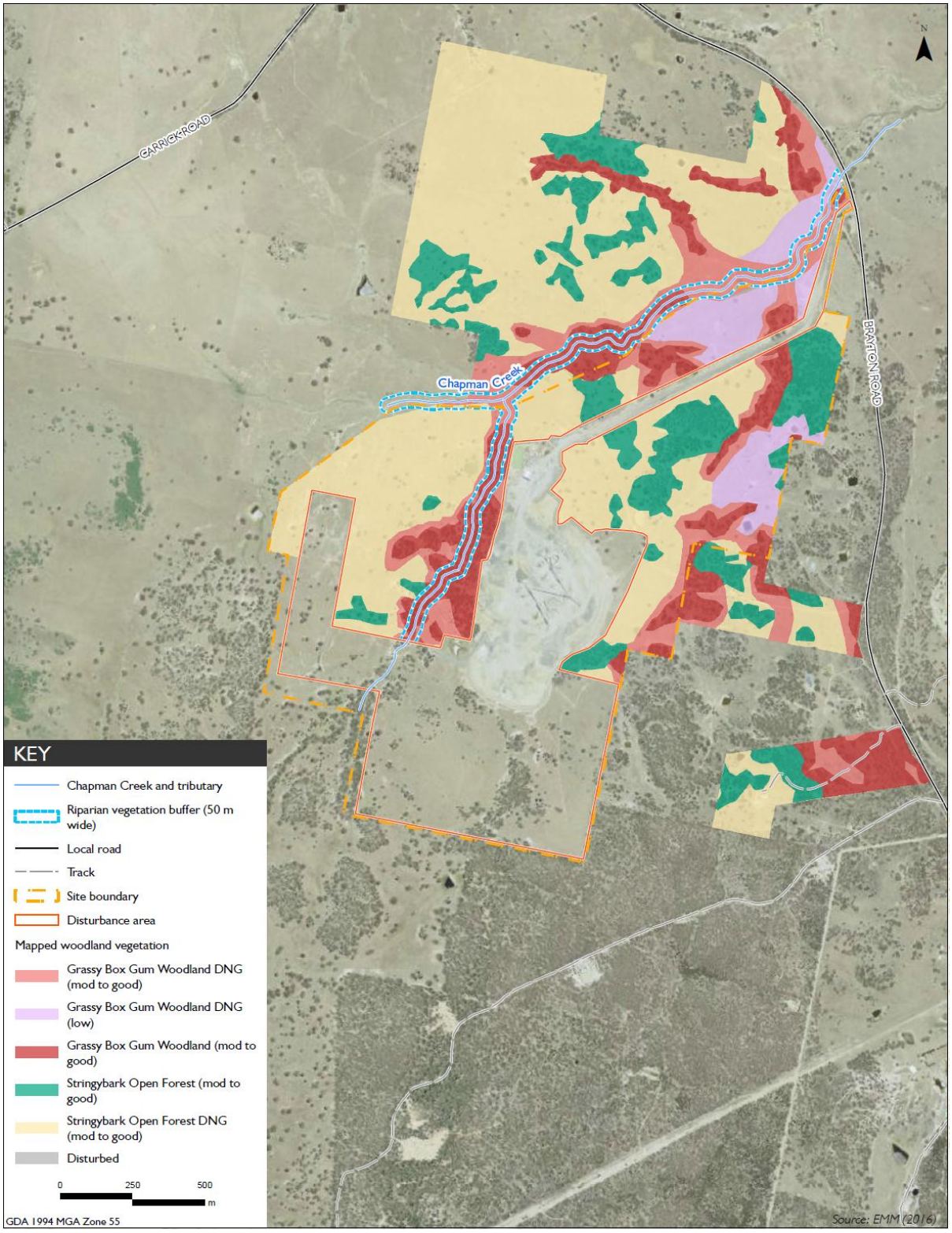


Figure: *Chapmans Creek Riparian Buffer*

APPENDIX B - EPA LICENCE

Environment Protection Licence

Licence - 13012

Licence Details	
Number:	13012
Anniversary Date:	13-July

Licensee

GUNLAKE QUARRIES PTY LIMITED

PO BOX 1665

DOUBLE BAY NSW 1360

Premises

GUNLAKE QUARRIES

715 BRAYTON ROAD

MARULAN NSW 2579

Scheduled Activity

Extractive activities

Resource recovery

Fee Based Activity	Scale
Land-based extractive activity	> 500000-2000000 T annual capacity to extract, process or store
Recovery of general waste	Any general waste recovered

Region

South East - Queanbeyan

11 Farrer Place
QUEANBEYAN NSW 2620

Phone: (02) 6229 7002

Fax: (02) 6229 7006

PO Box 622

QUEANBEYAN NSW 2620

Environment Protection Licence

Licence - 13012

Environment Protection Licence

Licence - 13012

Environment Protection Licence

Licence - 13012

Information about this licence

Dictionary

A definition of terms used in the licence can be found in the dictionary at the end of this licence.

Responsibilities of licensee

Separate to the requirements of this licence, general obligations of licensees are set out in the Protection of the Environment Operations Act 1997 ("the Act") and the Regulations made under the Act. These include obligations to:

- ensure persons associated with you comply with this licence, as set out in section 64 of the Act;
- control the pollution of waters and the pollution of air (see for example sections 120 - 132 of the Act);
- report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

Variation of licence conditions

The licence holder can apply to vary the conditions of this licence. An application form for this purpose is available from the EPA.

The EPA may also vary the conditions of the licence at any time by written notice without an application being made.

Where a licence has been granted in relation to development which was assessed under the Environmental Planning and Assessment Act 1979 in accordance with the procedures applying to integrated development, the EPA may not impose conditions which are inconsistent with the development consent conditions until the licence is first reviewed under Part 3.6 of the Act.

Duration of licence

This licence will remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister. A licence may only be surrendered with the written approval of the EPA.

Licence review

The Act requires that the EPA review your licence at least every 5 years after the issue of the licence, as set out in Part 3.6 and Schedule 5 of the Act. You will receive advance notice of the licence review.

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

- an administrative fee; and
- a load-based fee (if applicable).

Environment Protection Licence

Licence - 13012

The EPA publication “A Guide to Licensing” contains information about how to calculate your licence fees. The licence requires that an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints), be submitted to the EPA. The Annual Return must be submitted within 60 days after the end of each reporting period. See condition R1 regarding the Annual Return reporting requirements.

Usually the licence fee period is the same as the reporting period.

Transfer of licence

The licence holder can apply to transfer the licence to another person. An application form for this purpose is available from the EPA.

Public register and access to monitoring data

Part 9.5 of the Act requires the EPA to keep a public register of details and decisions of the EPA in relation to, for example:

- licence applications;
- licence conditions and variations;
- statements of compliance;
- load based licensing information; and
- load reduction agreements.

Under s320 of the Act application can be made to the EPA for access to monitoring data which has been submitted to the EPA by licensees.

This licence is issued to:

GUNLAKE QUARRIES PTY LIMITED
PO BOX 1665
DOUBLE BAY NSW 1360

subject to the conditions which follow.

Environment Protection Licence

Licence - 13012

1 Administrative Conditions

A1 What the licence authorises and regulates

A1.1 This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation.

Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.

Scheduled Activity	Fee Based Activity	Scale
Extractive activities	Land-based extractive activity	> 500000 - 2000000 T annual capacity to extract, process or store
Resource recovery	Recovery of general waste	Any general waste recovered

A1.2 The licensee must not carry on any scheduled activities until the scheduled development works are completed, except as elsewhere provided in this licence.

A2 Premises or plant to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
GUNLAKE QUARRIES
715 BRAYTON ROAD
MARULAN
NSW 2579
LOT 13 DP 1123374

A3 Information supplied to the EPA

A3.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.

In this condition the reference to "the licence application" includes a reference to:
a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and
b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.

Environment Protection Licence

Licence - 13012

2 Discharges to Air and Water and Applications to Land

P1 Location of monitoring/discharge points and areas

P1.1 The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.

Air

EPA identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
1	Dust Monitoring		Dust Deposition Gauge labelled DDG 1 on map titled "Figure A- Receptor and DDG locations- July 2009 " provided to DECC on 3 July 2009 (DOC09/31859)
2	Dust Monitoring		Dust Deposition Gauge labelled DDG 2 on map titled "Figure A- Receptor and DDG locations- July 2009 " provided to DECC on 3 July 2009 (DOC09/31859)
3	Dust Monitoring		Dust Deposition Gauge labelled DDG 3 on map titled "Figure A- Receptor and DDG locations- July 2009 " provided to DECC on 3 July 2009 (DOC09/31859)
4	PM 10 Monitoring		High Volume Air Sampler labelled R1 - HVAS on map titled "Figure A - Receptor and DDG locations - July 2009" provided to DECC on 3 July 2009 (DOC09/31859)
11	PM10 Monitoring		High Volume Air Sampler labelled R4 - HVAS on map titled "Figure 2 - Gunlake Quarry Environmental Monitoring Sites" submitted with licence variation application to EPA on 29 May 2018(DOC18/375566)

P1.2 The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.

P1.3 The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.

Water and land

EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description

7	Groundwater Monitoring	Bore labelled as 'GM 6' on Figure 2 in the document titled 'Groundwater and Surface Water Monitoring Program' received by DECC 15 June 2009 (DOC09/28459)
8	Groundwater Monitoring	Bore labelled as 'GM 13' on Figure 2 in the document titled 'Groundwater and Surface Water Monitoring Program' received by DECC 15 June 2009 (DOC09/28459)
9	Groundwater Monitoring	Bore labelled as 'GM 24' on Figure 2 in the document titled 'Groundwater and Surface Water Monitoring Program' received by DECC 15 June 2009 (DOC09/28459)
10	Groundwater Monitoring	Bore labelled as 'GM 36' on Figure 2 in the document titled 'Groundwater and Surface Water Monitoring Program' received by DECC 15 June 2009 (DOC09/28459)

3 Limit Conditions

L1 Pollution of waters

L1.1 Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.

L2 Waste

L2.1 The licensee must not cause, permit or allow any waste to be received at the premises, except the wastes expressly referred to in the column titled “Waste” and meeting the definition, if any, in the column titled “Description” in the table below.
Any waste received at the premises must only be used for the activities referred to in relation to that waste in the column titled “Activity” in the table below.
Any waste received at the premises is subject to those limits or conditions, if any, referred to in relation to that waste contained in the column titled “Other Limits” in the table below.
This condition does not limit any other conditions in this licence.

Code	Waste	Description	Activity	Other Limits
NA	General or Specific exempted waste	Cured concrete waste from a batch plant as defined in Section 49 Definitions of waste	As specified in each particular resource recovery exemption	No more than 30,000 tonnes per year imported to the site.

	classifications, in Schedule 1 of the Protection of the Environment Operations Act 1997, as in force from time to time.	No more than 2,500 tonnes at any one time.

L3 Noise limits

L3.1 Noise generated at the premises must not exceed the noise limits presented in the table below:

Noise Assessment Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
R7	38	38	38	45
R8	37	37	37	45
All other privately owned residences	35	35	35	45

Note: *For the purpose of the above table, the following definitions apply:*

- *Day - the period from 7.00am to 6.00pm Monday to Saturday; or 8.00am to 6.00pm on Sundays and Public Holidays*
- *Evening - the period from 6.00pm to 10.00pm*
- *Night - the remaining periods*

The locations referred to in the above table represent noise assessment locations as indicated in Appendix 3 'Noise Assessment Locations' in the document titled "ANNEXURE ‘A’ OF S34 AGREEMENT FILED 30 JUNE 2017 IN PROCEEDINGS NO: 108663 OF 2017 CONDITIONS OF CONSENT"

L3.2 To determine compliance with these noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary.

The noise limits apply under meteorological conditions of:

- wind speed up to 3m/s at 10m above the ground level;
- temperature inversion conditions of up to 3 degrees c/100m and wind speed up to 2m/s at 10m above the ground;
- where the wind velocity and temperature gradients are determined to be relevant to the project site in accordance with the NSW industrial Noise Policy.

L4 Blasting

L4.1 The overpressure level from blasting operations at the premises must not exceed 115dB (Lin Peak) for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L4.2 The overpressure level from blasting operations at the premises must not exceed 120dB (Lin Peak) at any time. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L4.3 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 5mm/sec for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L4.4 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 10mm/sec at any time. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L5 Hours of operation

L5.1 The licensee must comply with the operating hours listed in the below table:

Activity	Day	Time
Overburden removal/emplacement and drilling	Monday-Saturday	7.00am to 6.00pm
	Sunday and Public Holidays	None
Blasting	Monday-Friday	9.00am to 5.00pm
	Saturday, Sunday and Public Holidays	None
Quarrying operations (excluding overburden removal/emplacement and drilling)	Monday-Saturday	24-hours but not between 6.00pm Saturday to 2.00am Monday.
	Sunday and Public Holidays	None
Maintenance	Monday-Saturday Sunday and Public Holidays	Any time provided that the activity is not audible at any privately-owned residence
Loading and dispatching	Monday-Saturday	24-hours but not between 6.00pm Saturday to 2.00am Monday.
	Sunday and Public Holidays	None
Construction	Monday-Friday	7.00am to 6.00pm
	Saturday	8.00am to 1.00pm
	Sunday and Public Holidays	None

4 Operating Conditions

O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.
This includes:
a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

O2 Maintenance of plant and equipment

O2.1 All plant and equipment installed at the premises or used in connection with the licensed activity:
a) must be maintained in a proper and efficient condition; and
b) must be operated in a proper and efficient manner.

O3 Dust

O3.1 The plant must be maintained in a condition which minimises or prevents the emission of dust from the plant.

5 Monitoring and Recording Conditions

M1 Monitoring records

M1.1 The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.

M1.2 All records required to be kept by this licence must be:
a) in a legible form, or in a form that can readily be reduced to a legible form;
b) kept for at least 4 years after the monitoring or event to which they relate took place; and
c) produced in a legible form to any authorised officer of the EPA who asks to see them.

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;
c) the point at which the sample was taken; and
d) the name of the person who collected the sample.

M2 Requirement to monitor concentration of pollutants discharged

Environment Protection Licence

M2.1 For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:

M2.2 Air Monitoring Requirements

POINT 1,2,3

Pollutant	Units of measure	Frequency	Sampling Method
Particulates - Deposited Matter	grams per square metre per month	Monthly	Australian Standard 3580.10.1-2003

POINT 4,11

Pollutant	Units of measure	Frequency	Sampling Method
PM10	micrograms per cubic metre	Special Frequency 1	AS/NZS 3580.9.6:2003

M2.3 For the purposes of the table(s) above Special Frequency 1 means the collection of samples on a one day in six cycle using a HVAS fitted with size selective inlet for PM10.

M3 Testing methods - concentration limits

M3.1 Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:
a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or
b) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or
c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.

Note: The *Protection of the Environment Operations (Clean Air) Regulation 2010* requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".

M4 Recording of pollution complaints

M4.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.

M4.2 The record must include details of the following:
a) the date and time of the complaint;
b) the method by which the complaint was made;
c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
d) the nature of the complaint;
e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
f) if no action was taken by the licensee, the reasons why no action was taken.

M4.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M4.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M5 Telephone complaints line

M5.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.

M5.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

M5.3 The preceding two conditions do not apply until 3 months after: the date of the issue of this licence.

6 Reporting Conditions

R1 Annual return documents

R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:

1. a Statement of Compliance,
2. a Monitoring and Complaints Summary,
3. a Statement of Compliance - Licence Conditions,
4. a Statement of Compliance - Load based Fee,
5. a Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan,
6. a Statement of Compliance - Requirement to Publish Pollution Monitoring Data; and
7. a Statement of Compliance - Environmental Management Systems and Practices.

At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.

R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.

R1.3 Where this licence is transferred from the licensee to a new licensee:
a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:
a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

R1.5 The Annual Return for the reporting period must be supplied to the EPA via eConnect *EPA* or by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').

R1.6 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.

R1.7 Within the Annual Return, the Statements of Compliance must be certified and the Monitoring and Complaints Summary must be signed by:
a) the licence holder; or
b) by a person approved in writing by the EPA to sign on behalf of the licence holder.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

Note: An application to transfer a licence must be made in the approved form for this purpose.

R2 Notification of environmental harm

R2.1 Notifications must be made by telephoning the Environment Line service on 131 555.

R2.2 The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.

Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.

R3 Written report

R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:
a) where this licence applies to premises, an event has occurred at the premises; or
b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the

carrying out of the activities authorised by this licence,
and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.

R3.2 The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.

R3.3 The request may require a report which includes any or all of the following information:
a) the cause, time and duration of the event;
b) the type, volume and concentration of every pollutant discharged as a result of the event;
c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
g) any other relevant matters.

R3.4 The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.

7 General Conditions

G1 Copy of licence kept at the premises or plant

G1.1 A copy of this licence must be kept at the premises to which the licence applies.

G1.2 The licence must be produced to any authorised officer of the EPA who asks to see it.

G1.3 The licence must be available for inspection by any employee or agent of the licensee working at the premises.

Environment Protection Licence

Licence - 13012

Dictionary

General Dictionary

3DGM [in relation to a concentration limit]	Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples
Act	Means the Protection of the Environment Operations Act 1997
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
AMG	Australian Map Grid
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
annual return	Is defined in R1.1
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
BOD	Means biochemical oxygen demand
CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
COD	Means chemical oxygen demand
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.
cond.	Means conductivity
environment	Has the same meaning as in the Protection of the Environment Operations Act 1997
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991
EPA	Means Environment Protection Authority of New South Wales.
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 2009.
general solid waste (non-putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997

Environment Protection Licence

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flow weighted composite sample	Means a sample whose composites are sized in proportion to the flow at each composites time of collection.
general solid waste (putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environmen t Operations Act 1997
grab sample	Means a single sample taken at a point at a single time
hazardous waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
licensee	Means the licence holder descr bed at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997
MBAS	Means methylene blue active substances
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997
O&G	Means oil and grease
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997
premises	Means the premises described in condition A2.1
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence
reporting period	For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 mo nths. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
restricted solid waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
scheduled activity	Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997
special waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TM	Together with a number, means a test method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.

Environment Protection Licence

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TSP	Means total suspended particles
TSS	Means total suspended solids
Type 1 substance	Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements
Type 2 substance	Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements
utilisation area	Means any area shown as a utilisation area on a map submitted with the application for this licence
waste	Has the same meaning as in the Protection of the Environment Operations Act 1997
waste type	Means liquid, restricted solid waste, general solid waste (putrescible), general solid waste (non-putrescible), special waste or hazardous waste

Mr Julian Thompson

Environment Protection Authority

(By Delegation)

Date of this edition: 09-July-2009

End Notes

2	Licence varied by notice 1516660 issued on 16-Sep-2013
3	Licence transferred through application 1521128 approved on 23-Apr-2014 , which came into effect on 01-May-2014
4	Licence varied by notice 1522524 issued on 27-Oct-2014
5	Licence varied by notice 1532111 issued on 10-Aug-2015
6	Licence varied by notice 1565848 issued on 12-Jul-2018

Appendix C – Chapmans Creek Monitoring Report

Gunlake Quarry

Quarterly Monitoring of Chapmans Creek

Survey 1

July 2018 - June 2019

Contents

1. Introduction

1.1 Background

Gunlake Quarry is a hard rock quarry operated by Gunlake Quarries Pty Ltd and is located approximately 7 km northwest of Marulan, off the Brayton Road as shown in Appendix A**.** Gunlake Quarry produces a range of hardrock products for the Sydney construction industry.

The Quarry holds an Environment Protection Licence (EPL) 13012 issued by the EPA under the *Protection of the Environment Operations Act 1997* (POEP Act) and operates under the conditions of Development Consent: 2017/00108663. Condition 22 of Schedule 2 of the consent requires a program to monitor stream health and stability in the site which is detailed in the Soil and Water Management Plan. This report details the monitoring undertaken as required.

1.2 Chapmans Creek

Gunlake Quarry is located in the upper reaches of the Chapman's Creek catchment and is surrounded by undulating stony countryside primarily used for sheep and cattle grazing. Elevations range from approximately 690m AHD on the southern boundary to 620 m AHD on the eastern boundary at Brayton Road. Soils are shallow and generally of low fertility, consequently, pasture cover is generally low quality improved or native species. There is evidence of sheet and some gully erosion in the main watercourses around the quarry site.

The development site of the Gunlake Extension Project is wholly within the upper catchment of Chapman's Creek. Chapman's Creek is an ephemeral creek which flows generally from south to north through the Gunlake property, and then east to its confluence with Joarimin Creek approximately 1km downstream of the site. Joarimin Creek in turn flows north to join the Wollondilly River. Chapman's Creek and its tributaries are intermittent streams which flow only following significant rainfall events.

The catchment area and riparian zones have previously been extensively modified for agricultural production, predominantly grazing of sheep and cattle. The adjacent flats of Chapman's Creek are only susceptible to temporary inundation after prolonged storms. The areas surrounding the creek have been cleared and vegetation is highly disturbed. Noxious woody weeds are present on creek banks, with a predominance of blackberry. Severe erosion is present along many sections of the river bank, and multiple gully heads have formed at the southern upstream end.

The current ecological state of Chapmans Creek has been poor for some time as an influence of disturbance from clearing and previous agricultural use. Chapmans Creek is still at risk of damage due to the quarry works existing on the adjacent land. Regular monitoring and maintenance is therefore required to ensure the creek health does not deteriorate further.

This is the first annual monitoring report of Chapmans Creek, which aims to outline the current health of the riparian ecosystem and any changes observed over subsequent reporting periods.
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2. Monitoring Program

The attributes of the Quarry form the basis of ongoing management principles governing the need to protect water systems, both surface and groundwater, during quarrying activities as well as managing the remaining land for agricultural and biodiversity uses. The water management system has been designed to protect Chapmans Creek.

2.1 Surface Water Monitoring

Gunlake Quarry has a well-established ambient water quality monitoring program inclusive of a substantive database on Chapmans Creek. Surface water samples are collected quarterly from two sites within Chapman's Creek to determine a basis for potential impact assessment as the quarry progresses. The data shows that the upper reaches of Chapmans Creek are predominantly dry and only flow following heavy rain events, while the lower section towards Brayton Road at the Gunlake property boundary consists largely of unconnected stagnant pools which respond more quickly to rainfall events and tend to dry rapidly in periods of dry weather.

Appendix A shows the location of the surface water monitoring sites. The sites include two sampling locations on Chapmans Creek downstream of the operation known as RW1 and RW2. RW1 is located at the Quarry entrance adjacent to Brayton Road, whilst RW2, which is often dry, is sampled approximately 1km upstream of RW1 within the property. The upstream site (site I) that was required to be monitored under the previous project approval is no longer required to be monitored as sufficient background data on Chapmans Creek exists for the purposes of impact assessment.

The water quality has been monitored and significant parameters outlined in the TARPs as developed for the Soil and Water Management Plan. Electrical Conductivity, pH, and Total Dissolved Solids have been compared to historical background levels taken at Site I in order to identify any harmful changes to the creeks' water quality.

2.2 Channel Stability

As with most ephemeral streams, the intermittent flow events in Chapmans Creek give rise to infrequent but often high sediment movement. Ephemeral streams tend to remain apparently stable for long periods until major storm events when high flows cause channel scour and mass movement of sediment downstream. Although these are natural events, the loss of riparian vegetation through past agricultural activities can result in higher than normal instability of channels and banks.

The collection of quarterly water samples, taken during flow events, correspond with inspections of channel stability and evidence of erosion or sedimentation. High flows are natural channel forming events and the movement of sediments downstream can also have beneficial effects on fluvial systems. The monitoring therefore needs to consider what is natural and what may have been exacerbated by past and current land uses. Changes to the creek banks, heads and floor will be monitored using a series of four photo-points which will be compared to identify changes over time, as presented in the results section below. This program will include identification of the causes of deterioration which could relate to reduced groundwater baseflow within the alluvial. Any changes which may have occurred as a result of quarry activities will be noted separately and corrected as soon as practicable.

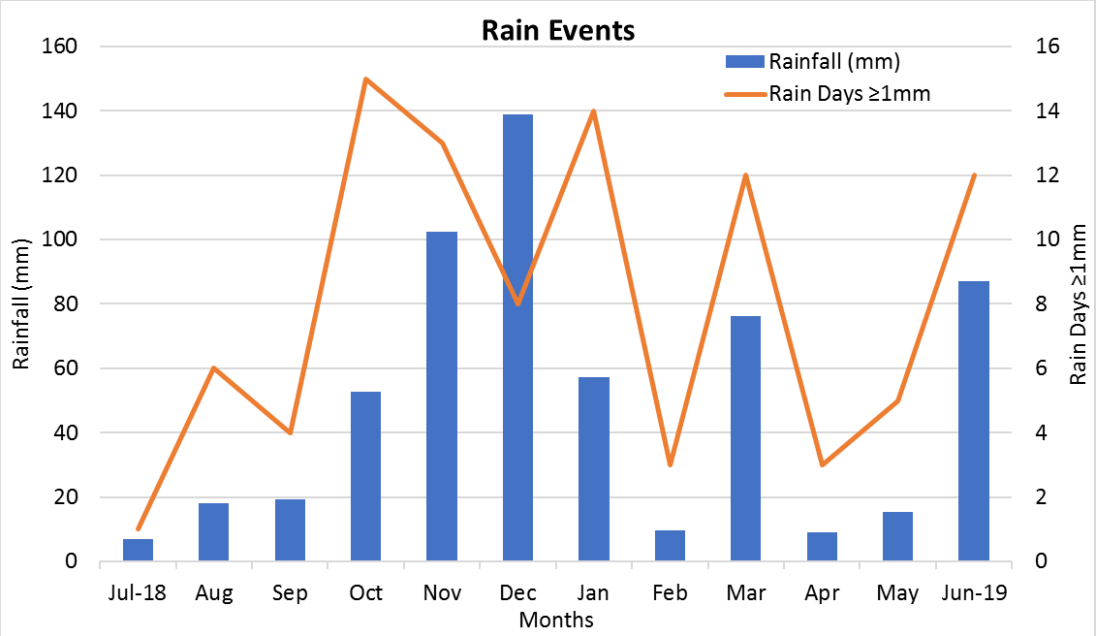
3. Results

3.1 Weather Results

Rainfall data for past year was collected at the Gunlake weather station. Raw data is provided in Table 3.1 while a summary of recent years is provided in Graph 1 below.

Table 3.1 – Total Monthly Rainfall (mm) (2018/19)

Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	**Tot**
7	18.2	19.4	52.8	102.4	138.8	57.2	9.6	76.2	9.2	15.4	87	593.2
Number of Rain Days (≥1mm)												
1	6	4	15	13	8	14	3	12	3	5	12	96



Graph 1 – Monthly Rainfall and Number of Rain Days

During this reporting period, the highest rainfall was experienced in December with 138.8mm. Meanwhile, July 2018, February, April and June 2019 all experienced less than 10mm per month. The months with the highest number of rain days were October, January and November, with 15, 14 and 13 days of rain above 1mm respectively.

The low flow of the creek during this period has prevented further damage to the walls of the bank. Since there was no occurrence of overland flow of excess water from severe storm events into the upstream catchment of the creek, the gully heads have remained stable and no further erosion is visible.

The state of Chapmans Creek is expected to remain relatively stable under equivalent rainfall events. The event of extremely high rainfall experienced in the future may lead to the requirement of bank and gully stabilisation measures to be put in place.

3.2 Surface Water Monitoring

The data shows that there is generally an increasing trend in pH, salinity, sodium and chloride downstream within Chapman's Creek, while nitrogen, phosphorous, iron and manganese tend to decrease downstream. This data forms the basis for impact assessment as the quarry progresses

The data shows that water quality in Chapmans Creek is largely influenced by groundwater baseflow. Salt levels are generally above 1,200 µS/cm with neutral pH. During high flow, the salt content would likely decrease.

Table 3.2 – Monitoring Results for Sites for, RW1, RW2 and PWD (Sample Date 21/06/2018)

Analyte	Units	RW1	RW2 (DRY)	PWD
pH	pH units	7.52		7.86
Electrical Conductivity	uS/cm	787		563
Total Suspended Soilds (TSS)	mg/L	53		50
Total Dissolved Solids (TDS)	mg/L	512		366
Total Phosphorus as P (TP)	mg/L	<0.01		<0.01
Total Nitrogen as N (TN)	mg/L	1.1		3.5
Dissolved Oxygen (DO)	mg/L	9.6		10.3
Turbidity	NTU	76.1		72.5
Chloride	mg/L	180		70
Calcium	mg/L	27		16
Magnesium	mg/L	27		15
Sodium	mg/L	72		67
Potassium	mg/L	4		5
Total Aluminium	mg/L	----		----
Total Arsenic	mg/L	<0.001		<0.001
Total Cobalt	mg/L	<0.001		0.002
Total Copper	mg/L	0.002		0.003
Total Manganese	mg/L	0.058		0.115
Total Nickel	mg/L	0.002		0.002
Total Zinc	mg/L	0.014		0.009
Total Iron	mg/L	1.92		2.77
Oil and Grease	visual inspection	None vis ble		None visible

Table 3.3 – Monitoring Results for Sites for, RW1, RW2 and PWD (Sample Date 27/09/2018)

Analyte	Units	RW1	RW2 (DRY)	PWD
pH	pH units	7.81		9.17
Electrical Conductivity	uS/cm	537		856
Total Suspended Soilds (TSS)	mg/L	68		32
Total Dissolved Solids (TDS)	mg/L	349		556
Total Phosphorus as P (TP)	mg/L	<0.01		<0.01
Total Nitrogen as N (TN)	mg/L	1.1		3.8
Dissolved Oxygen (DO)	mg/L	7.7		9.3
Turbidity	NTU	74.2		29.3
Chloride	mg/L	92		154
Calcium	mg/L	22		18
Magnesium	mg/L	17		25
Sodium	mg/L	44		106
Potassium	mg/L	4		7
Total Aluminium	mg/L	1.79		1.31
Total Arsenic	mg/L	<0.001		<0.001
Total Cobalt	mg/L	<0.001		<0.001
Total Copper	mg/L	0.003		0.004
Total Manganese	mg/L	0.116		0.083
Total Nickel	mg/L	<0.001		<0.001
Total Zinc	mg/L	0.01		<0.005
Total Iron	mg/L	1.28		10.5
Oil and Grease	visual inspection	None vis ble		None visible

Table 3.4 – Monitoring Results for Sites for, RW1, RW2 and PWD (Sample Date 29/11/2018)

Analyte	Units	RW1	RW2	PWD	Drop Cut
pH	pH units	7.53	7.79	8.39	8.09
Electrical Conductivity	uS/cm	850	1530	374	1260

Analyte	Units	RW1	RW2	PWD	Drop Cut
Total Suspended Soilds (TSS)	mg/L	194	30	150	14
Total Dissolved Solids (TDS)	mg/L	552	994	243	819
Total Phosphorus as P (TP)	mg/L	0.14	0.07	0.08	0.01
Total Nitrogen as N (TN)	mg/L	1.8	2.2	4.3	11.1
Dissolved Oxygen (DO)	mg/L	9.2	9.4	9.3	9.4
Turbidity	NTU	312	59.5	347	24.3
Chloride	mg/L	259	480	54	349
Calcium	mg/L	23	39	9	42
Magnesium	mg/L	33	64	8	47
Sodium	mg/L	84	156	53	128
Potassium	mg/L	5	5	3	6
Total Aluminium	mg/L	14.8	3.15	12.6	1.12
Total Arsenic	mg/L	0.002	<0.001	0.002	<0.001
Total Cobalt	mg/L	0.005	0.001	0.005	<0.001
Total Copper	mg/L	0.01	0.003	0.007	0.003
Total Manganese	mg/L	0.224	0.115	0.232	0.032
Total Nickel	mg/L	0.007	0.002	0.005	0.001
Total Zinc	mg/L	0.027	0.006	0.034	<0.005
Total Iron	mg/L	11.3	2.26	10.7	0.88
Oil and Grease	visual inspection	None visible	None vis ble	None visible	None visible

Table 3.5 – Monitoring Results for Sites for, RW1, RW2 and PWD (Sample Date 02/4/2019)

Analyte	Units	RW1	RW2	PWD	Drop Cut
pH	pH units	7.73	7.95	8.21	7.94
Electrical Conductivity	uS/cm	248	4730	518	882
Total Suspended Soilds (TSS)	mg/L	20	10	91	16
Total Dissolved Solids (TDS)	mg/L	161	3070	337	573
Total Phosphorus as P (TP)	mg/L	0.09	<0.01	0.09	0.04
Total Nitrogen as N (TN)	mg/L	0.9	0.6	6.1	5.4
Dissolved Oxygen (DO)	mg/L	6.3	7.4	8.6	8.8
Turbidity	NTU	32.7	1.1	118	7.3
Chloride	mg/L	39	1200	56	162
Calcium	mg/L	13	107	13	29
Magnesium	mg/L	9	172	12	27
Sodium	mg/L	24	428	75	75
Potassium	mg/L	5	8	4	5
Total Aluminium	mg/L	----	----	----	----
Total Arsenic	mg/L	<0.001	<0.001	<0.001	<0.001
Total Cobalt	mg/L	<0.001	<0.001	0.001	<0.001
Total Copper	mg/L	<0.001	<0.001	<0.001	<0.001
Total Manganese	mg/L	0.051	0.136	0.071	0.01
Total Nickel	mg/L	0.001	0.001	0.002	<0.001
Total Zinc	mg/L	0.007	<0.005	0.014	<0.005
Total Iron	mg/L	1.26	0.17	4.66	0.18
Oil and Grease	visual inspection	None visible	None vis ble	None visible	None visible

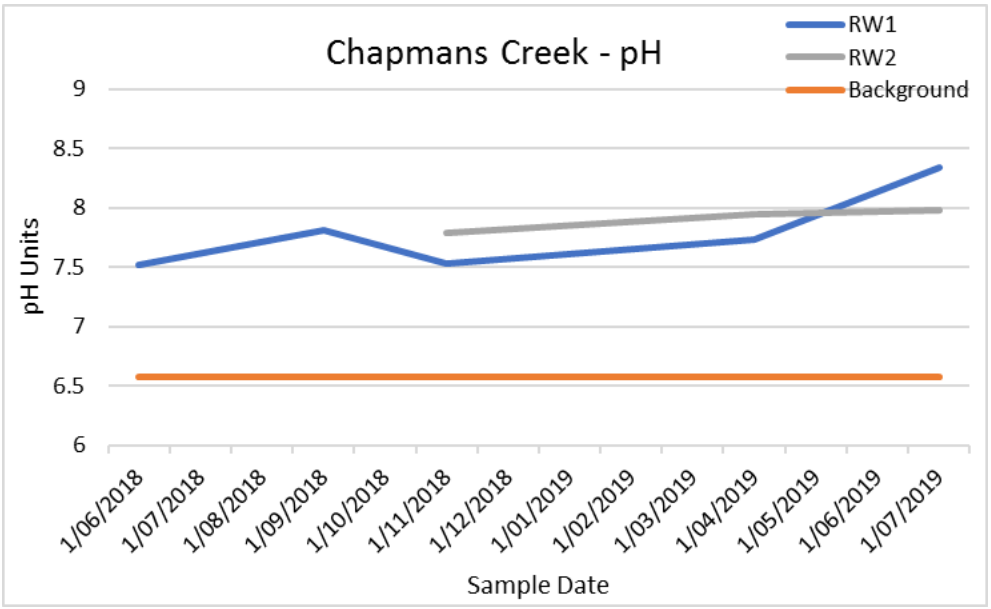
Table 3.6 – Monitoring Results for Sites for, RW1, RW2 and PWD (Sample Date 02/7/2019)

Analyte	Units	RW1	RW2	PWD	Drop Cut
pH	pH units	8.34	7.98	8.01	8.56
Electrical Conductivity	uS/cm	1760	2860	360	933
Total Suspended Soilds (TSS)	mg/L	14	15	98	5
Total Dissolved Solids (TDS)	mg/L	1140	1860	234	606
Total Phosphorus as P (TP)	mg/L	0.01	<0.01	0.09	<0.01
Total Nitrogen as N (TN)	mg/L	0.8	6.6	3.6	5.8
Dissolved Oxygen (DO)	mg/L	12	11.3	11.3	11.6
Turbidity	NTU	3.9	0.9	218	0.9
Chloride	mg/L	481	733	44	216
Calcium	mg/L	50	67	9	34
Magnesium	mg/L	68	112	8	34
Sodium	mg/L	185	315	54	90
Potassium	mg/L	5	6	3	5
Total Arsenic	mg/L	<0.001	<0.001	0.001	<0.001
Total Cobalt	mg/L	<0.001	0.001	0.004	<0.001
Total Copper	mg/L	0.002	0.005	0.006	<0.001

Analyte	Units	RW1	RW2	PWD	Drop Cut
Total Manganese	mg/L	0.011	0.006	0.202	0.006
Total Nickel	mg/L	<0.001	<0.001	0.003	<0.001
Total Zinc	mg/L	<0.005	<0.005	0.03	<0.005
Total Iron	mg/L	0.16	0.05	8.01	0.12
Oil and Grease	visual inspection	None visible	None vis ble	None visible	None visible

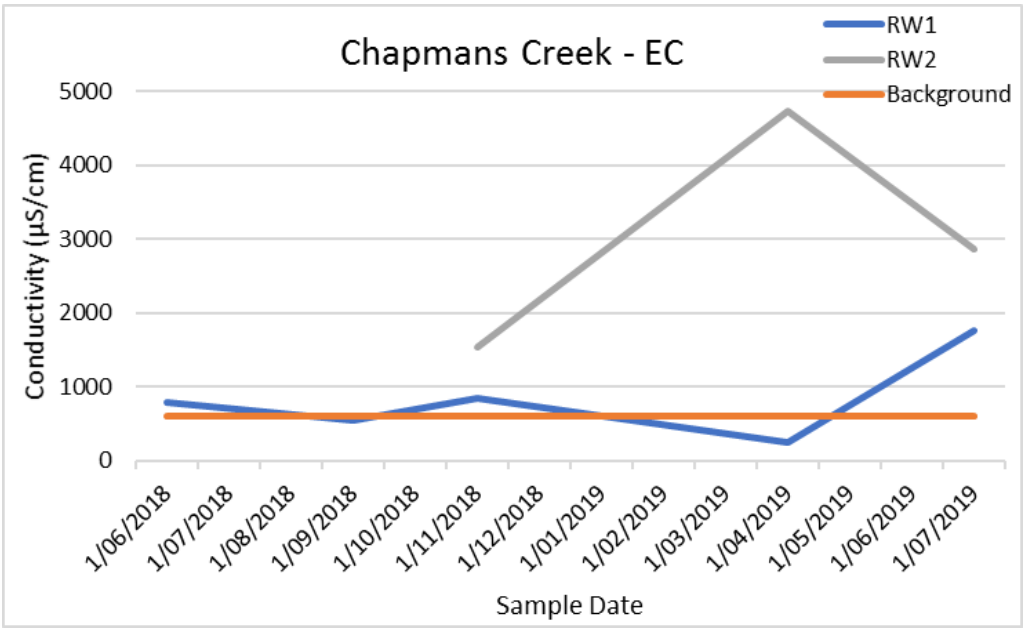
Graph 2 to Graph 5 below show the water quality parameters of the two downstream Chapmans Creek sample sites RW1 and RW2 over the past reporting period alongside the historical background average taken at the original sampling Site I. RW2 was dry during June and September 2018, therefore only three results are presented for this site. The data in the graphs below shows that water quality in Chapmans Creek is largely influenced by groundwater baseflow.

Graph 2 shows the pH of Chapmans Creek over the past 12 months. The pH has remained within a 0.5 pH unit band for the duration of the year among both sites. RW1 is situated 1km downstream of RW2, recording a pH averaging at 7.8 pH units compared to a slightly higher average of 7.9 pH units at RW2. The Creek is currently sitting at a neutral pH approximately 1 pH unit higher than the historical background average. The 2018-2019 pH levels are well above the trigger level of 6.0 indicated in the TARPs in Table 5.2 below.



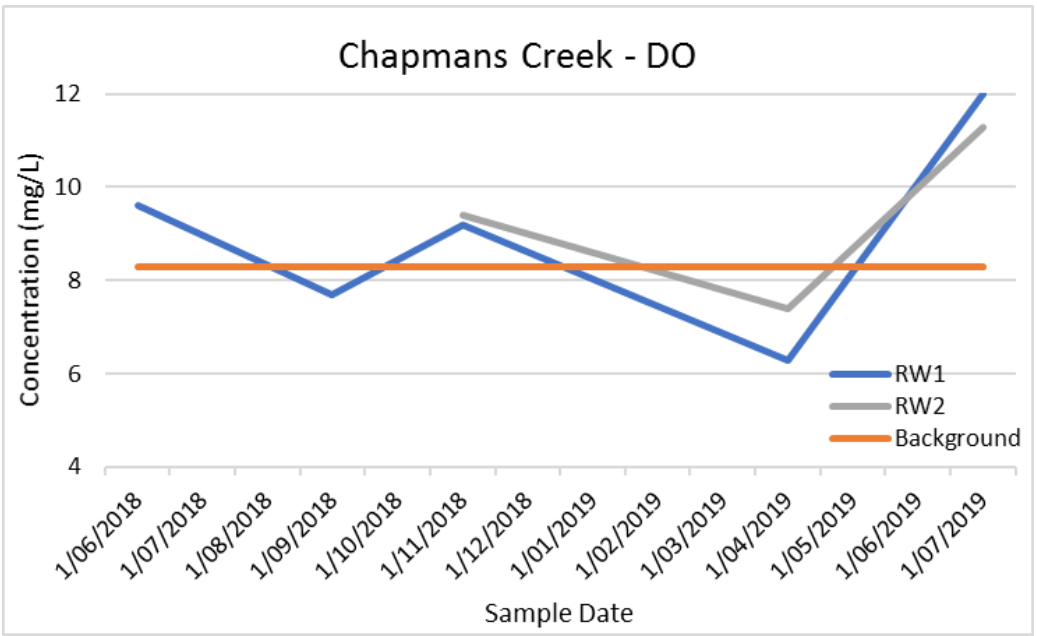
Graph 2- Chapmans Creek pH levels

Electrical conductivity of Chapmans Creek at RW1 and RW2 over the 2018/2019 reporting period are presented in Graph 3. Salinity levels recorded at RW1 averaging at 796 µS/cm are similar to historical background averages of 596 µS/cm. Conductivity levels at RW2 were significantly higher with an average of 3040 µS/cm. This is not a concern, as levels are lowered by RW1 where water leaves the site at Brayton road, and during high flow, the salt content would likely decrease.



Graph 3- Chapmans Creek Electrical Conductivity

Dissolved oxygen levels are relatively similar for RW1, RW2 and the background average. These are very consistent results, remain in a range for healthy aquatic biodiversity in line with background levels from the upstream Site I. The averages of all three samples are within 0.2mg/L, as displayed on Graph 4.



Graph 4- Chapmans Creek Dissolved Oxygen

3.2.1 Trigger Action Response

The following triggers in Table 3.7 do not relate to any specific action required by the Quarry but rather are designed to enable the quarry to determine if there are any impacts caused as a result of the quarry development.

Table 3.7 - Trigger Action Response Plan

Trigger	Action Required	Any Follow Up Actions
Water Quality (when discharging)		
When the quarry is discharging, a 'significant' decrease in water quality in particular decreasing pH, increasing EC and increasing TDS in time in Chapmans Creek upstream of Brayton Road. A significant decrease is defined as: 1. a pH less than 6.0 2. A gradually increasing trend in EC & TDS values compared with any trends observed in the historic background monitoring site in Chapmans Creek (referred to as Site I).	Continue to monitor and assess surface water quality data during and after discharge events. Establish trends and correlate with quarrying activities and climatic data (rainfall) to determine any causal link with Gunlake quarrying operations. Apply statistical analysis to assess trends if required. Compare water quality data in downstream monitoring sites with water quality data from the background monitoring site (Site I).	If evolving geochemical anomalies are detected in downstream surface water samples in Chapmans Creek (compared with water quality at the background monitoring - Site I) and an impact from the proposed quarrying is suspected or demonstrated, carry out follow-up verification sampling at the two monitoring sites within 30 days of the receipt of the anomalous analytical results. Collate, interpret results and assess significance of any impacts. Develop mitigation measures the detail of which will depend on the type, distribution and degree of impact.
Stream flow (when extraction depth exceeds 20m)		
A 'significant' decrease in stream flow over time that may or may not be associated with quarrying activities	Continue to monitor and assess stream flow data, establish trends and correlate with quarrying activities, climatic data (rainfall) and water table fluctuations in monitoring bores. Apply statistical analysis to assess trends if required. Determine whether any decrease in stream flow may be due to impacts from the proposed quarrying	Continue to monitor and assess stream flow data and assess trends. In the unlikely event that some, or all the reduction of stream flow in Chapmans Creek is assessed by the hydrogeological and/or surface water consultant to be due to impacts from quarrying, determine at what stage the stream flow was impacted upon and the likely mechanism for the decrease in flow. Develop a contingency plan to restore any stream flows.

It is important to note that it is necessary for Gunlake Quarry to actively recycle process water to maintain operations during normal to dry rainfall years. Excess water will only occur during above average rainfall patterns which may necessitate offsite discharges or transfers to occur. As the quarry expands, the need for offsite discharge will diminish but the need to recycle water will remain.

3.3 Creek Stability

The cleared land for agricultural purposes has resulted in excessive overland runoff, and severe gully erosion to occur in Chapmans Creek in the past. Quarterly monitoring of the Creek is essential following periods of higher rainfall in order to identify and manage further detrimental changes to the creek caused by erosion.

Four photopoints have been identified along the creek and are monitored closely to observe changes over time. These locations have been selected at relatively even intervals at areas of variable levels of damage in order to create a broad snapshot of the creek. The location of this riparian monitoring area is shown in Appendix A.

- Photopoint 1 is the furthermost downstream photopoint. It lies adjacent to the Quarry carpark and the PWD. Upstream and downstream photos are taken at this point. The area visible from Photopoint 1 is relatively flat with minor erosion visible.
- Photopoint 2 is located approximately 300m upstream of Photopoint 1. Photos are taken both upstream and downstream at this point and moderate levels of rill erosion are monitored.

- Photopoint 3 is located at a steep drop in the bank approximately 2m in height. Severe erosion is to be monitored at this point, particularly from the downstream view at the undercutting of a large eucalypt.
- Photopoint 4 is the gully head at the beginning of the Creek on the Gunlake Site. Further upstream movement of the gully erosion is monitored at this point.

3.3.1 July 2018


Photopoint 1 – Looking Upstream and Downstream


Photopoint 2 – Looking Upstream and Downstream

Photopoint 3 – Looking Downstream

3.3.2 December 2018

Photopoint 1 – Looking Upstream and Downstream

Photopoint 2 – Looking Upstream and Downstream


Photopoint 3 – Looking Upstream and Downstream


Photopoint 4 – Looking upstream at gully head

3.3.3 April 2019

Photopoint 2 – Looking Upstream and Downstream

Photopoint 3 – Looking Downstream

3.3.4 June 2019

Photopoint 2 – Looking Upstream and Downstream

Photopoint 3 – Looking Downstream



Photopoint 4 – Looking upstream at gully head

During the reporting period, no evidence of any further erosion was recorded at the four Photopoints. Erosion is minimal at Photopoint 1, as banks are shallow and are well vegetated. A relatively dense infestation of serrated tussock is visible in the downstream photographs of Photopoint 1.

Photopoint 2 shows some rill erosion on the right bank in the downstream photo. It is possible that during high rainfall, water gushes into the creek from this section. The previous year has not received heavy rain, and no changes to this erosion was visible over the four monitoring periods. The upstream facing photos show infestation of the exotic weed Blackberry on the northern bank. The creek floor has positive vegetation growth, with grass cover for the duration of the year and water reeds visible in December 2018.

Highly disturbed riparian vegetation is visible in Photopoint 3. The roots of large trees growing on the embankment are exposed due to erosion cutting into the bank supporting their structure. Further erosion could possible lead to the failure of the bank resulting in trees falling. The bank drop is over two metres high in this section, although no changes were visible during the reporting period. Blackberry is also visible from Photopoint 3.

The gully heads in Photopoint 4 were monitored in December 2018 and June 2019. The gully erosion has not extended during this period, however continued monitoring is required following heavy rainfall.

4. Recommendations and Conclusion

The purpose of this report is to monitor the status and health of Chapmans Creek within the Gunlake Quarry site boundary to ensure further damage is not incurred.

Subject to management provisions in the conservation agreement and rehabilitation and biodiversity offset management plan, staged management of the Creek will be scheduled in future reporting periods. This will involve strategic infill of tube stock and weed removal practices.

Vegetative surface cover is the key to mitigating erosion of the creek banks by absorbing heavy impacts from water runoff. The weeds present on the banks including serrated tussock and blackberry should be sprayed with caution to ensure chemical runoff does not travel into the waterways. Physical removal is not recommended however, until a stable cover of native vegetation is established. Removal of the weed species would leave a bare slope and disturbance to the soil which will increase the associated impacts of erosive forces.

The gully heads have not caused any further damage over the past 12 months and are currently in a stable state. It is recommended to leave this section untouched, as disturbance of the surrounding soils is likely to reactivate the gully to cause further erosion. This area must be monitored quarterly and following heavy rainfall to ensure that erosion does not continue.

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Goulburn Mulwaree Council (2014), Goulburn Mulwaree Waterways Plan: A plan to rehabilitate and protect Goulburn Mulwaree's waterways

NSW Weedwise, (2019) Blackberry (*Rubus fruticosus* species aggregate), DPI https://weeds.dpi.nsw.gov.au/Weeds/Blackberry

NSW Weedwise, (2019) Serrated Tussock (*Nassella trichotoma),* DPI https://weeds.dpi.nsw.gov.au/Weeds/Details/123

Pattison, M, and Turner, B.M. (2008) *Lake Bathurst and The Morass Wetlands Background Paper*. Prepared for the Hawkesbury Nepean Catchment Management Authority, WetlandCare Australia, NSW.

Appendix A Monitoring Sites

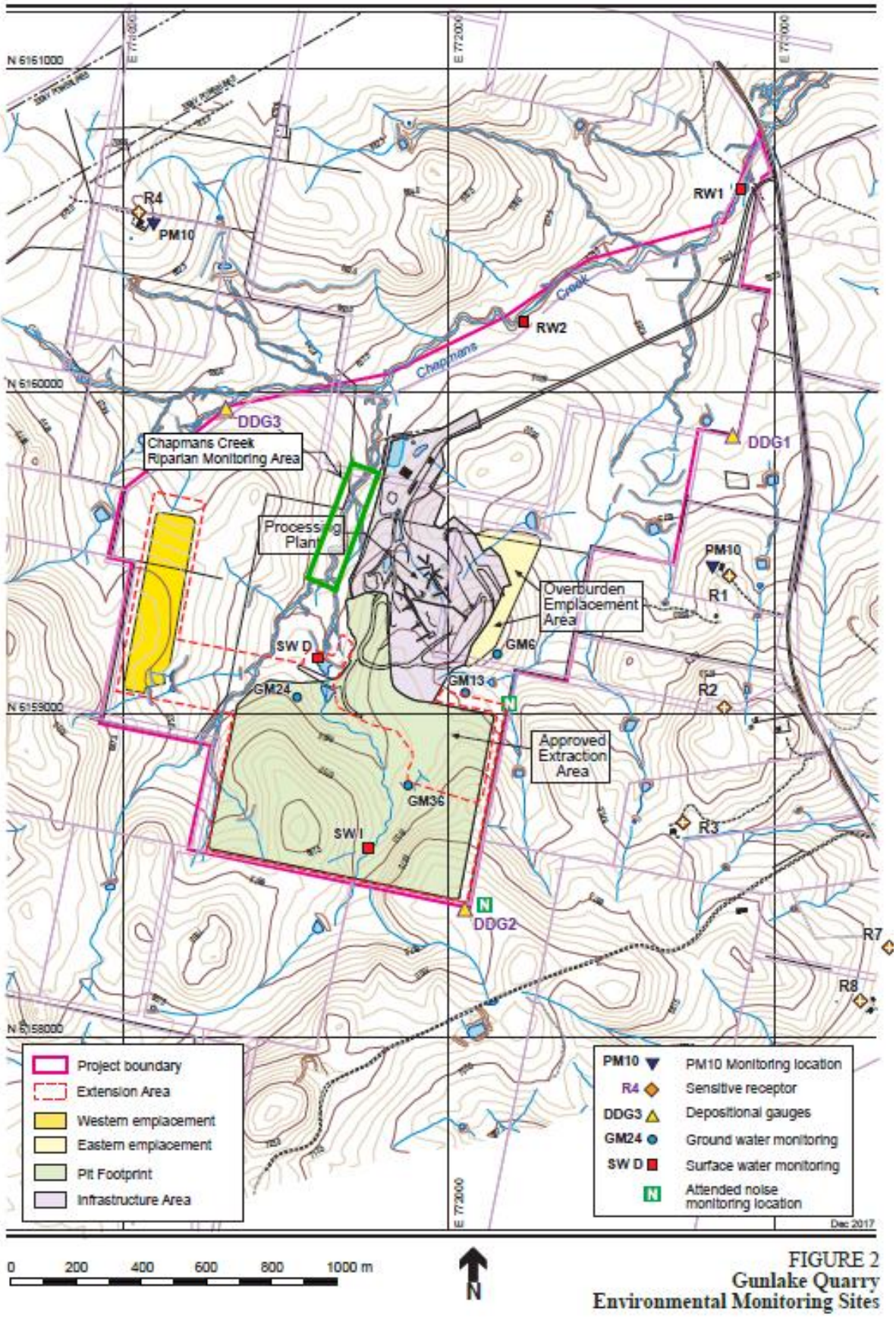

FIGURE 2
Gunlake Quarry
Environmental Monitoring Sites