[redacted] B. Surv; M.I.S. Aust. • [redacted] B. Surv; (Hons); M.I.S. Aust. • [redacted] BTP. CPP.

Blakebrook Quarry
2019 Annual Monitoring Report

Our Ref: 190653

Date: March 2020

Newton Denny Chapelle
SURVEYORS PLANNERS ENGINEERS

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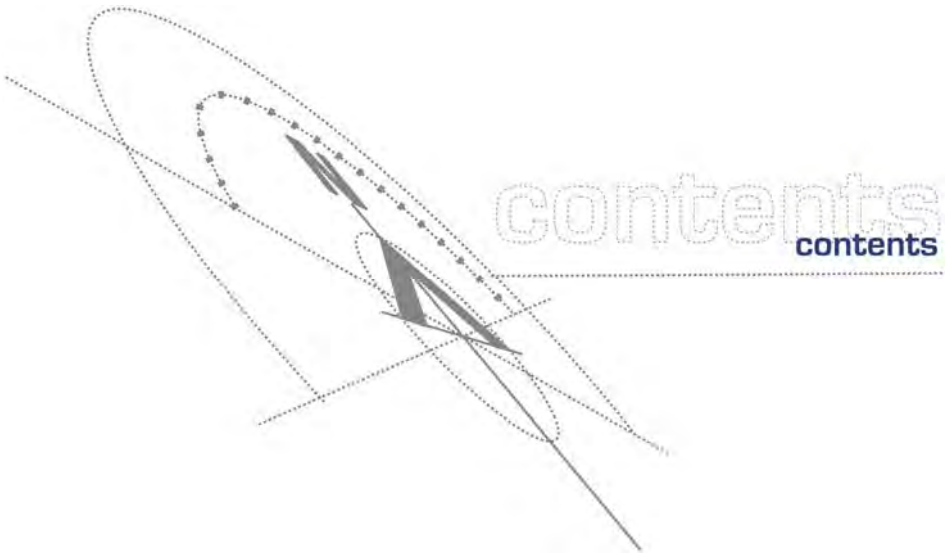


contents

Attachments:

1. Part 3A Approval No.07_0020 (Mod 1)
2. DPE Comments of 2018 AEMR
3. EPA Licence 3384

4A. Extractive Materials Return – July 2018 – June 2019

4B Stockpile and Production Report – January to December 2019

5. 2019 Quarry Truck Movements

6 Section 94 Levies 2019

7. Noise Monitoring Report 2019

8. Dust Monitoring Data 2019

9. Surface Water Monitoring Data 2019

10. Ground Water Monitoring Data 2019

11. Bioregional Assessment of Water Resources 2015

12. Community Consultative Committee Minutes 2019

13. Information Available on LCC Website.

14. Complaints Register

i Preamble

Blakebrook Quarry is a basalt quarry located off Nimbin Road approximately 6 kilometres north-west of Lismore. **Plate i** provides a Location Plan of the quarry, whilst **Plate ii** provides an air view of the quarry, including areas set aside for the purpose of environmental offsets.

The quarry is operated by Northern Rivers Quarries (NRQ) which is a commercial entity operated by Lismore City Council. The quarry is identified as a 'State significant' resource and provides a range of quarry products to northern NSW. Material provided include: aggregates, drainage rock, road base, basalt and argillite products, metal dust, fill material and select fill (overburden).

The quarry initially started operations in 1979 with development consent formally granted by Lismore City Council in 1995. Approval was granted for the expansion of the quarry in November 2009 via Part 3A Approval No. 07_0020. This approval was issued by the Minister for Planning and was subject to an extensive list of consent conditions. In September 2017, approval was issued for Modification 1 to the consent. A copy of the approval (as modified) is provided at **Attachment 1**.

One of the conditions of the approval requires the Quarry Operator to prepare an annual review of the environmental performance of the quarry and submit this documentation to the Department of Planning & Environment (DPE). The current report has been prepared to comply with this requirement.

Note: An Asphalt Plant also operates within the boundary of Blakebrook Quarry. The asphalt plant is subject to a separate development application and has different approval, operating and reporting requirements. The current AEMR therefore relates to the quarry only, and not the Asphalt Plant.

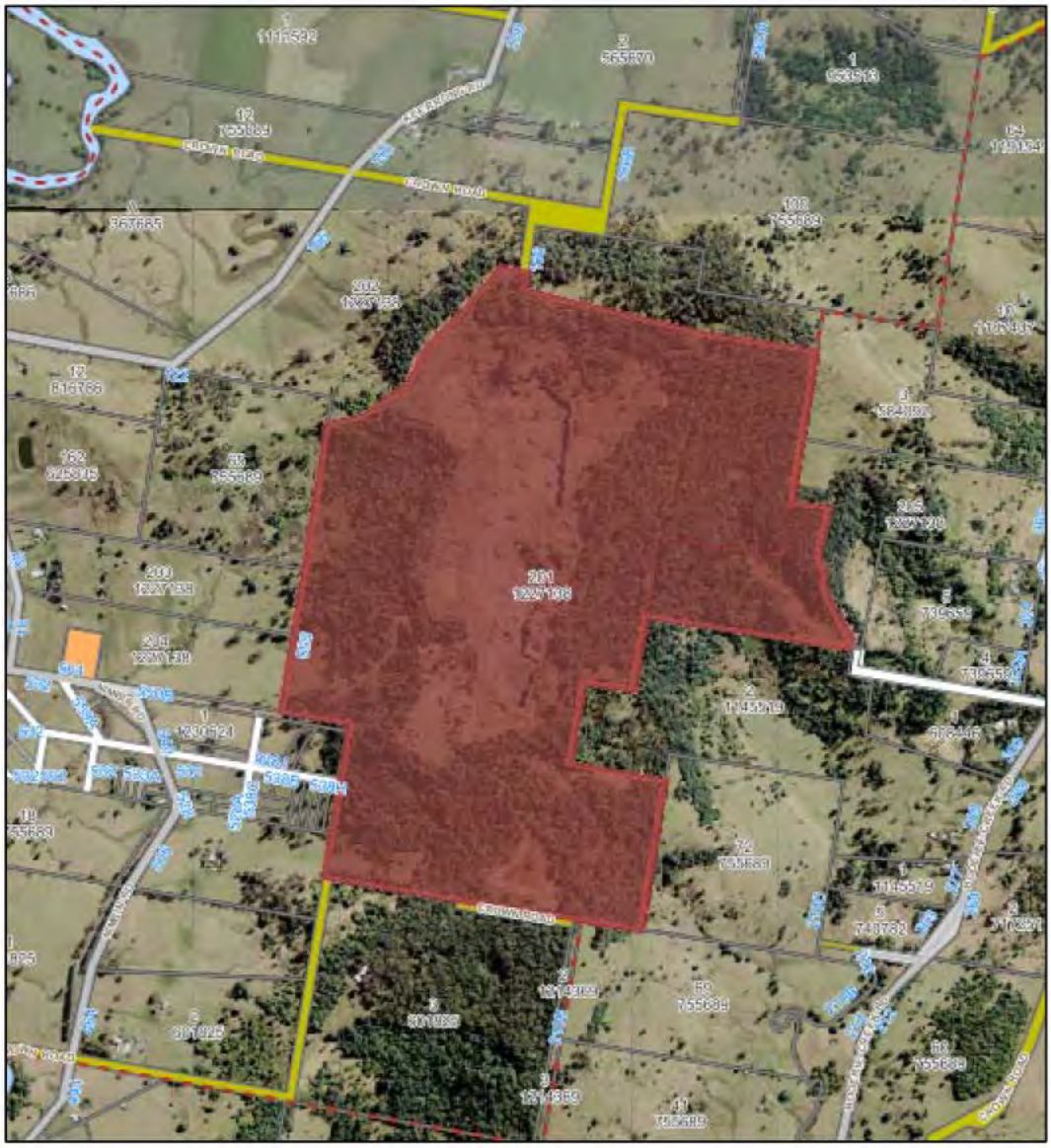


Plate i – Location Plan

(Image Source: Biodiversity & Rehabilitation Plan 2019, ERM,)

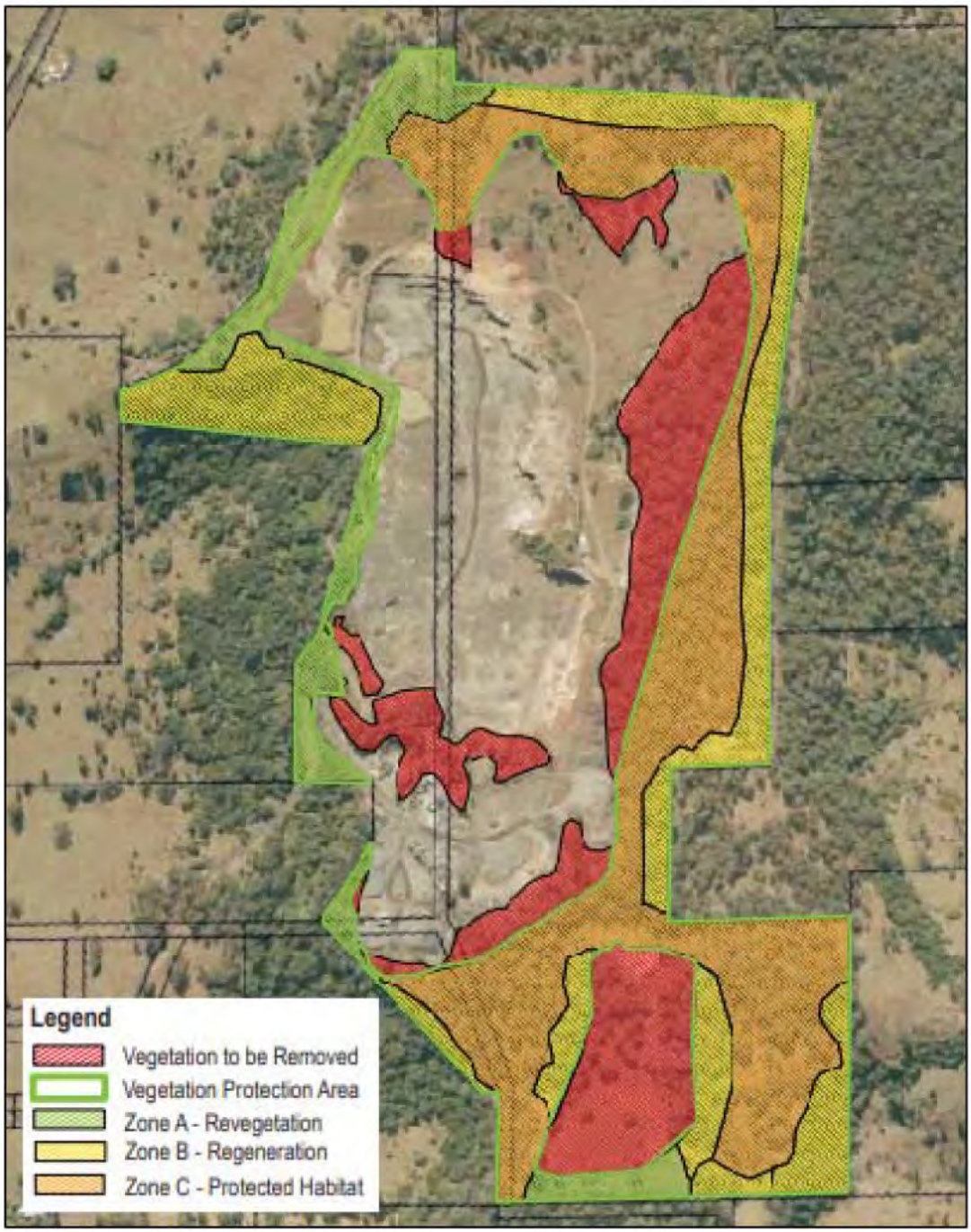


Plate ii –Environmental Offset Areas
(Image Source: Biodiversity & Rehabilitation Plan 2019, ERM,)

Part 1 - Preliminary

1.1 Introduction

a) 1.1.1 Purpose

Newton Denny Chapelle (NDC) has been engaged by Lismore City Council (LCC) to complete the 2019 Annual Environmental Management Report (AEMR) for Blakebrook Quarry. This report is prepared in response to Schedule 5 Condition 11 of the Blakebrook Quarry Part 3A Approval No. 07_0020 (Mod 1).

b) 1.1.2 Reporting Period

This AEMR relates to the reporting period 1 January 2019 to 31 December 2019 and will be submitted to the DPE in March 2020. It details actions taken during 2019, provides a snapshot of progress on compliance issues and elaborates on planned activities for the coming year.

c) 1.1.3 Information Provided

The information contained herewith is provided in accordance with the requirements of Condition 11 of the approval (as modified).

It is noted that the Asphalt Plant which operates within the quarry footprint does not form part of development approval MP 07_0020 (Mod 1). Rather, the Asphalt Plant is approved and regulated via DA 1990/431 (as amended) approved by Lismore City Council and EPA Licence No.3384. Accordingly, the environmental performance of the Asphalt Plant does not form part of the current AEMR for Blakebrook Quarry.

1.2 Relevant Approvals

S75W Approval (Modification 1) to Project Approval 07_0020 was approved in September 2017. A copy of the relevant Notice of Modification is provided at **Attachment 1**. The approval was issued by the Minister for Planning and expires on 31 December 2039.

Blakebrook Quarry is also subject to EPA Licence 3384 which is issued by the NSW Environment Protection Authority pursuant to the *Protection of the Environment Operations Act 1997*. The licence provides details with respect to a range of environmental thresholds to be complied with during the operation of the Quarry. The Licence is reviewed annually, with a copy of the current Licence provided at **Attachment 3.**

1.3 Applications to Amend Approval

There is currently one application lodged with the DPE to modify Part 3A Approval No. 07_0020. In this regard, an application was lodged to DPE on 11 January 2019 to amend Part 3A Approval No. 07_0020 (Mod 1) to amalgamate the approvals for the Asphalt Plant and the Quarry. As part of this, a request has been made to DPE seeking changes to a number of conditions and commitments within the approval notice that are considered to be either duplicates, inaccurate reflections of operations or onerous requirements.

DPE requested further information concerning the application, which was provided to DPE on 22 January 2020. Given that this amendment has not been determined, Approval No. 07_0020 (Mod 1) remains the current approval for Blakebrook Quarry.

1.4 DPE Response to 2019 AEMR

The 2019 AEMR was submitted to DPE on 5 April 2018 in accordance with a timeframe agreed with DPE. On 7 May 2019, DPE advised that the AEMR was "*generally in accordance with the approval*". A copy of this response in provided at **Attachment 2**. DPE then made a number of specific comments and requested that these matters be tabulated within the 2019 AEMR. **Table 1** is provided in response to this request.

Table 1 – Response to DPE Comments

DPE Comment	Response
Schedule 3, Condition 19 – The Soil and Water Management Plan has been amended and approved with changes to monitoring frequency and trigger limits. Please ensure that during the 2019 reporting period that monitoring is undertaken in accordance with the amended plan and any exceedances of criteria reported to the Department as required;	Noted. Refer to the assessment against Schedule 3, Condition 19
Schedule 3, Condition 19 – The site water balance provided as Attachment 10 covers the 2017 reporting period. The Department notes that the 2018 water balance is currently available on the Proponent's website attached to the Soil and Water Management Plan. Please ensure that the consolidated AEMR updates Attachment 10 to the correct year and is uploaded to the Proponent's website by 17 May 2019;	The updated version of the site water balance was uploaded to the LCC website concurrent with the Soil and Water Management Plan.

Schedule 3, Condition 29 and 30 – The Biodiversity and Rehabilitation Management Plan was updated and approved by the Department on 14 March 2019. An Independent Environmental Audit was submitted and review finalised by the Department on 24 April 2019. As noted by the Proponent in the AEMR, this triggers a review of the sum of the Biodiversity and Rehabilitation Bond. To satisfy the requirements of Schedule 3, Condition 30 this review must be complete and submitted to the Department by 14 May 2019 as this date is the first to occur.	The updated Biodiversity and Rehabilitation Bond was paid by LCC on 26 August 2019.

Part 2 – Statement of Compliance

2.1 Introduction

Part 2 provides a comprehensive compliance assessment relating to each condition of consent applicable to MP07_0020. Each condition is reproduced in full and then followed by the findings of the 2019 AEMR.

Schedule 1 – Description of Approval

Schedule 1 describes the development, approval dates and delegations. No compliance statement is required.

Schedule 2 – Administrative Conditions

Schedule 2 - Condition 1 (Minimise Harm)

Condition

In addition to meeting the specific performance measures and criteria established under this approval, the Proponent must implement all reasonable and feasible measures to prevent or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the project.

Compliance Statement

Noted.

Schedule 2 - Condition 2 (Comply with Approval)

Condition

The Proponent must carry out the project:

(a) generally in accordance with the EA and EA (Mod 1); and

(b) in accordance with the conditions of this approval, Project Layout Plan and the Statement of Commitments.

Compliance Statement

Noted.

Schedule 2 - Condition 3 (Interpretation)

Condition

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 approval shall prevail to the extent of any inconsistency.

Compliance Statement

Noted.

Schedule 2 - Condition 4 (Compliance with Written Instruction)

Condition

The Proponent must comply with any written 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 approval (including any stages of these documents);

(b) any reviews, reports or audits undertaken or commissioned by the Department regarding compliance with this approval;

(c) and the implementation of any actions or measures contained in these documents.

Compliance Statement

Section 1.4 summarises the DPE comments with respect to the 2018 AEMR and documents how these requirements were responded to by the quarry operator.

Schedule 2 - Condition 5 (Surrender of Former Consent)

Condition

By 30 June 2010, the Proponent shall surrender development consent DA 95/239 to the relevant consent authority to the satisfaction of the Secretary.

Compliance Statement

Completed.

Schedule 2 - Condition 6 (Expiry of Approval)

Condition

The Proponent may carry out quarrying operations on the site until 31 December 2039.

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

Compliance Statement

Noted. Rehabilitation requirements not applicable to current stage of development.

Schedule 2 - Condition 7 (Quarry Depth)

Condition

The Proponent must not undertake quarrying operations below 55 m AHD in the northern pit or 105 m AHD in the southern pit.

Note: Drainage sumps may be constructed below this level with the agreement of the Secretary.

Compliance Statement

No blasting occurred in 2019. Quarry operations did not extend below the nominated levels in 2019.

Schedule 2 - Condition 8 (Limits on Approval)

Condition

The Proponent must not:

(a) transport more than 600,000 tonnes of quarry materials from the site per calendar year; or

(b) dispatch more than 100 laden trucks from the site on any calendar day.

Note: Dispatch of laden trucks is also controlled under condition 1 of Schedule 3.

Compliance Statement

(a) Quarry Materials

The DRG (now DPIE) extractive return reflects product sales for the financial year rather than calendar year as required by this condition. The correction of this administration error forms part of the current request to the Department to modify the terms of Part 3A Approval No. 07_0020 (Mod 1).

As a result, data sets for both financial year production sale tonnages and calendar year production tonnages have been provided at **Attachments 4A and 4B**. Both data sets are substantially less than the 600,000 Tonnes permitted by Schedule 2 -Condition 8.

(b) Truck Movements

Attachment 5 contains a schedule of recorded truck movements from the site, whilst **Table 2** summarises the maximum daily truck movement for each month in 2019. The vehicle movements are in accordance with the terms of Schedule 2 Condition 8, with no exceedances of the daily permitted allowance of 100 vehicles.

Table 2– Summary of Truck Movements 2019

	January	February	March	April	May	June	July	August	September	October	November	December
Highest Number of Trucks / Day	37	40	22	84	69	67	65	61	39	100	76	67
Average Number of Trucks / Day	7.54	16.04	6.26	21.81	38.46	23.77	28.22	18.67	9.48	19.74	21.04	3.92
Total Number of Trucks /Month	196	401	169	567	1000	618	762	504	237	533	547	102

Schedule 2 - Condition 9 (New Buildings & Structures)

Condition

Structural Adequacy

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

Notes:

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

Compliance Statement

Noted. No buildings constructed in 2019.

Schedule 2 – Condition 10 (Demolition)

Condition

Demolition

The Proponent 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.

Compliance Statement

Noted. No demolition of structures in 2019.

Schedule 2 – Condition 11 (Protection of Public Infrastructure)

Condition

Protection of Public Infrastructure

Unless the Proponent and the applicable authority agree otherwise the Proponent must:

(a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the project; and

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

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 13 of Schedule 2.

Compliance Statement

No damage to public infrastructure occurred as the result of the project in 2019.

Schedule 2 – Condition 12 (Plant & Equipment)

Condition

The Proponent must ensure that all the plant and equipment used at the site, or to monitor the performance of the project is:

(a) maintained in a proper and efficient condition; and

(b) operated in a proper and efficient manner.

Compliance Statement

Council fleet maintenance is managed by contracted fleet suppliers. Contractors evaluated as part of the procurement process must have adequate operation, maintenance and safety procedures in place. Environmental monitoring largely completed by contractors. A condition of engagement requires that a regular maintenance program completed for all monitoring equipment.

Schedule 2 – Condition 13 (Roads Contributions)

Condition

The Proponent must pay Council an annual financial contribution toward the maintenance of local roads used for haulage of quarry products. The contribution must be determined in accordance with the Lismore City Council Section 94 Contribution Plan, 2004, or any subsequent relevant contributions plan adopted by Council.

Compliance Statement

S7.11 fees are paid to Lismore City Council on a monthly basis. **Attachment 6** provides a spreadsheet of the payment data from 2019.

Schedule 2 – Condition 14 (Production Data)

Condition

The Proponent must:

(a) from the commencement of quarrying operations provide calendar year annual quarry production data to DRG using the standard form for that purpose; and

(b) include a copy of this data in the Annual Review.

Compliance Statement

Annual production data was provided to the Department of Trade on 26/8/19. A copy of the supplied data is provided at **Attachment 4A**.

Schedule 2 – Condition 15 (Compliance with Conditions)

Condition

The Proponent must ensure that all employees, contractors and sub-contractors are aware of, and comply with, the conditions of this approval relevant to their respective activities.

Compliance Statement

LCC advises that staff are briefed on approval requirements (relevant to their responsibilities) as part of the induction process.

Schedule 2 – Condition 16 (Extraction Limits)

Condition

The Proponent must ensure that the boundaries of the approved limits of extraction are clearly marked at all times in a permanent manner that allows operating staff and inspecting officers to clearly identify those limits.

Compliance Statement

LCC advises that extraction boundaries are clearly identified on site with metal stakes. These were viewed by DPE officers at their last inspection.

Schedule 3 – Specific Environmental Conditions

NOISE – HOURS OF OPERATION

Schedule 3 - Condition 1 (Hours of Operation)

Condition

The Proponent must comply with the operating hours set out in Table 1.

Table 1: Operating hours

Activity	Permissible Hours
Quarrying operations including loading and dispatch of laden trucks	7 am to 6 pm Monday to Friday
	7 am to 3 pm Saturday
	At no time on Sundays or public holidays
Blasting	10 am to 3 pm Monday to Friday (except public holidays)
	At no time on Sundays or public holidays
Maintenance	May be conducted at any time, provided that these activities are not audible at any privately-owned residence

Compliance Statement

The following observations are made with respect to hours of operation of the quarry:

a) Quarry opening hours are advertised on the LCC website as follows:
   - 7am - 4pm Monday to Thursday
   - 7am - 3.30pm Friday

   The opening hours are compliant with the approved operating hours for the premises.

b) No blasting has occurred in 2019; and

c) Quarry Management advises that no significant maintenance was completed outside of the nominated operating hours.

Schedule 3 – Condition 2 (Exception to Hours of Operation)

Condition

The following activities may be carried out outside the hours specified in condition 1 above:

(a) delivery or dispatch of materials as requested by Police or other public authorities; and

(b) emergency work to avoid the loss of lives, property or to prevent environmental harm.

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

Compliance Statement

Quarry Management advises that no significant works or activities were completed outside of the operating hours nominated in Schedule 3 Condition 1.

Schedule 3 – Condition 3 (Noise)

Condition

The Proponent must ensure that the noise generated by the project does not exceed the criteria in Table 2 at any residence on privately-owned land.

Table 2: Noise criteria dB(A)

Receiver	Day $L_{Aeq\ (15\ minute)}$
Location 2	36
All other locations	35

Noise generated by the project is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy. Appendix 5 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 2 do not apply if the Proponent has an agreement with the relevant landowner to exceed the noise criteria, and the Proponent has advised the Department in writing of the terms of this agreement.

Compliance Statement

a) Environmental Assessment Predictions

The Noise Impact Assessment lodged with the development application included the following predicted operational noise levels.

Table 3: Predicted Operational Noise Levels

Receiver Area	Predicted Noise LA_{eq} dB(A) Scenario			PSNL LA_{eq} dB(A)
	1.	2.	3.	Day
Location 1	33	33	33	38
Location 2	34	36	36	38
Location 3	<30	<30	<30	35
Location 4	<30	<30	<30	35
Location 5	33	33	31	35
Location 6	<30	<30	<30	35
Location 7	35	35	33	35

Notes:

- Scenario 1 – proposed overburden stripping
- Scenario 2 – proposed central operation
- Scenario 3 – proposed northern operation

b) Monitoring Results

The 2019 Annual Noise Monitoring Assessment was completed in November / December 2019 by Ambience Audio Services. A copy of the report documenting the findings of this assessment is provided at **Attachment 7. Plate 1** illustrates the locations where monitoring occurred.

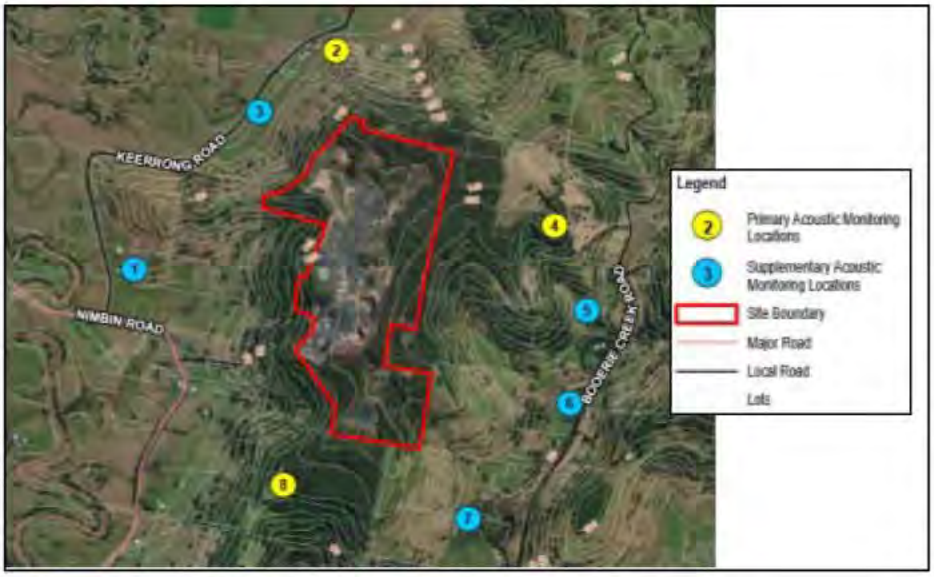


Plate 1 – Noise Monitoring Locations

The report summary advises as follows:

> *"The Blakebrook Quarry operates under EPL No. 3384. Condition L6.1 stipulates that noise from the premises must not exceed 35dB(A) LAeq,15min during the day (7am to 6pm) Monday to Saturday. The current Noise and Blast Management Plan V3.1 (Aug 2018) allows a limit of 36dB(A) LAeq,15min. at Receiver 2 (previously Receiver 3).*
>
> *Measurements were conducted at 6 receiver locations while the quarry was operating under load conditions. The quarry was not audible at receiver locations 1, 4 and 6. The quarry was just audible at times at receiver locations 2 and 3. The rock hammer was audible at Receiver 8.*
>
> *The quarry operational noise levels (LAeq,15min) were not able to be accurately assessed at residential receiver monitoring locations as the quarry noise was not audible or barely audible against other noise sources such as moving foliage.*
>
> *It is estimated from the recorded LA90,15 min levels and observations, that the quarry noise levels are below the Project Specific Noise Level of 35 dB(A) Leq,15mins at Receiver locations 1, 2, 3, 4, 6 and 8.*
>
> *As Receiver 8 is close to the southern cell, it is recommended that noise monitoring be conducted at Receiver 8 when work in the southern cell is undertaken".*

NOISE – OPERATION CONDITIONS

Schedule 3 – Condition 4 (Noise Monitoring)

Condition

The Proponent must:

(a) implement best practice management to minimise the construction, operational and road transportation noise of the project;

(b) minimise the noise impacts of the project during meteorological conditions when the noise criteria in this approval do not apply (see Appendix 5);

(c) carry out noise monitoring (at least every 3 months or as otherwise agreed with the Secretary) to determine whether the project is complying with the relevant conditions of this approval; and

(d) regularly assess noise monitoring data and modify and/or stop operations on site to ensure compliance with the relevant conditions of this approval, to the satisfaction of the Secretary.

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

Compliance Statement

The noise monitoring is traditionally completed on an annual basis in November consistent with previous monitoring periods. In this instance, monitoring commenced in November 2019, with follow up assessments completed in December 2019 to ensure compliance with the monitoring requirements documented within the Noise and Blast Management Plan Version 3.1 (ERM Aug. 2018).

In 2019, no complaints were received with respect to noise generation at the quarry. Accordingly, LCC is of the view that more frequent monitoring is not warranted.

NOISE – MANAGEMENT PLAN

Schedule 3 – Condition 5 (Noise Management Plan)

Condition

The Proponent must prepare a Noise Management Plan for the project to the satisfaction of the Secretary. This plan must:

(a) be prepared in consultation with the EPA;

(b) be submitted to the Secretary within 3 months of the determination of Modification 1, unless otherwise agreed by the Secretary;

(c) describe the measures to be implemented to ensure:

- *compliance with the noise criteria and operating conditions of this approval;*
- *best practice management is being employed; and*
- *the noise impacts of the project are minimised during meteorological conditions under which the noise criteria in this approval do not apply (see Appendix 5);*

(d) describe the proposed noise management system; and

(e) include a monitoring program to be implemented to measure noise from the project against the noise criteria in Table 2.

The Proponent must implement the Noise Management Plan as approved from time to time by the Secretary.

Compliance Statement

The Noise and Blast Management Plan (Rev 3.1) was updated and approved by DPE in 2018.

BLASTING – IMPACT ASSESSMENT CRITERIA

Schedule 3 – Condition 6 (Blast Parameters)

Condition

The Proponent must ensure that blasting on site does not cause any exceedance of the criteria in Table 3.

Table 3: 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 Proponent has a written agreement with the relevant owner to exceed the limits in Table 3, and the Proponent has advised the Department in writing of the terms of this agreement.

Note: In early 2016, agreement was reached with the owner of former Receiver 9 (located at Lot 8 DP 240441) concerning noise monitoring results at that property. DPE was advised of this agreement in May 2016. Accordingly, the above assessment criteria do not apply to Receiver 9. Given this, Receiver 9 has been removed as a primary acoustic monitoring location and a new monitoring location selected.

Compliance Statement

a) Environmental Assessment Predictions

The environmental assessments concluded that compliance with the above criteria should be able to be achieved during operation.

b) Monitoring Results

No blasting occurred in 2019.

BLASTING – FREQUENCY

Schedule 3 – Condition 7 (Number of Blasts)

Condition

The Proponent may carry out a maximum of 2 blasts per month, 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.

Compliance Statement

No blasting occurred in 2019.

BLASTING - OPERATION CONDITIONS

Schedule 3 – Condition 8 (Blast Management)

Condition

During blasting operations, the Proponent must:
(a) implement best practice management to: protect the safety of people and livestock; protect public or private infrastructure and property from damage; and minimise the dust and fume emissions;
(b) operate a suitable system to enable the local community to get up-to-date information on the proposed blasting schedule on site; and
(c) carry out regular monitoring to determine whether the project is complying with the relevant conditions of this approval, to the satisfaction of the Secretary.

Compliance Statement

The updated Noise and Blast Management Plan completed in 2018 includes management measures relating to these matters. As advised above, no blasting occurred in 2019.

BLASTING – MANAGEMENT PLAN

Schedule 3 – Condition 9 (Blast Management Plan)

Condition

The Proponent must prepare a Blast Management Plan for the project to the satisfaction of the Secretary. This plan must:
(a) be submitted to the Secretary for approval within 3 months of the determination of Modification 1, unless otherwise agreed by the Secretary;
(b) describe the measures to be implemented to ensure compliance with the blast criteria and operating conditions of this approval;
(c) include measures to manage flyrock to ensure the safety or people and livestock and to protect property;

(d) include a monitoring program for evaluating and reporting on compliance with the blasting criteria in this approval;
(e) include local community notification procedures for the blasting schedule, in particular to nearby residences; and
(f) include a protocol for investigating and responding to complaints related to blasting operations.
The Proponent must implement the Blast Management Plan as approved from time to time by the Secretary.

Compliance Statement

The Noise and Blast Management Plan (Rev 3.1) was updated and endorsed by the DPE in 2018.

AIR QUALITY - IMPACT ASSESSMENT CRITERIA

Schedule 3 – Condition 10 (Air Quality)

Condition

The Proponent must ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the project do not cause exceedances of the criteria in Table 4 at any residence on privately-owned land.

Table 4: Air quality criteria

Pollutant	Averaging Period	Criterion	
Particulate matter < 10 µm (PM_{10})	Annual	[a,d] 25 µg/m³	
Particulate matter < 10 µm (PM_{10})	24 hour	[b] 50 µg/m³	
Total suspended particulates (TSP)	Annual	[a,d] 90 µg/m³	
[c] Deposited dust	Annual	[b] 2 g/m²/month	[a,d] 4 g/m²/month

Notes to Table 4:

a) Cumulative impact (i.e. increase in concentrations due to the project plus background concentrations due to all other sources).

b) Incremental impact (i.e. increase in concentrations due to the project alone, with zero allowable exceedances of the criteria over the life of the project.

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 11, 12 and 13 to develop and implement an air quality management system that ensures operational responses to the risks of exceedance of the criteria.

Compliance Statement

Dust monitoring stations are established at three sites around the Quarry NW, SW and East. Results from the 2019 monitoring period are provided at **Attachment 8**. A review of this documentation confirms that the monitoring has been completed in accordance with the required schedule of 30 days (+/- 2 days).

Breaches to the nominated levels were identified as follows:

- Dust exceedance at monitoring location D1 (on site, northwest of quarry pit) for monitoring period 26/08/2019 to 24/09/2019. The dust licence limit is 4g/m2/month, whilst on this occasion dust was reported as 6.6 g/m2/month.

  Council investigated this exceedance and identified that during the exposure period the water truck stationed at Blakebrook Quarry was unavailable for several days as it was being utilised to assist Fire and Rescue NSW during an emergency event to control a significant fire at the Lismore Waste Facility. The area was also impacted by significant winds and smoke from the Lismore Waste Facility and other bushfires in proximity. Council concluded that the combination of these factors led to an abnormal increase in dust results for the Quarry.

- Dust exceedance at monitoring location D1 (on site, northwest of quarry pit) for monitoring period 18/11/2019 – 16/12/2019. Dust licence limit is 4g/m2/month, on this occasion dust was reported as 8.6 g/m2/month. All other monitoring points did not exceed dust limits.

  Council investigations concluded that "*exceedingly dry weather and strong winds in the reporting period are likely to have generated dust in the area, particularly with grass cover decreasing. In addition to this, the local government area has been impacted by weather and smoke from surrounding bushfires including Nimbin to the north and Myall Creek Road to the south…The Air Quality Index for PM10 and PM2.5 during the period was Hazardous [>200], the maximum daily average being 325…It is anticipated that the combination of the extreme weather conditions may have led to an abnormal increase in dust results for the Quarry.*"

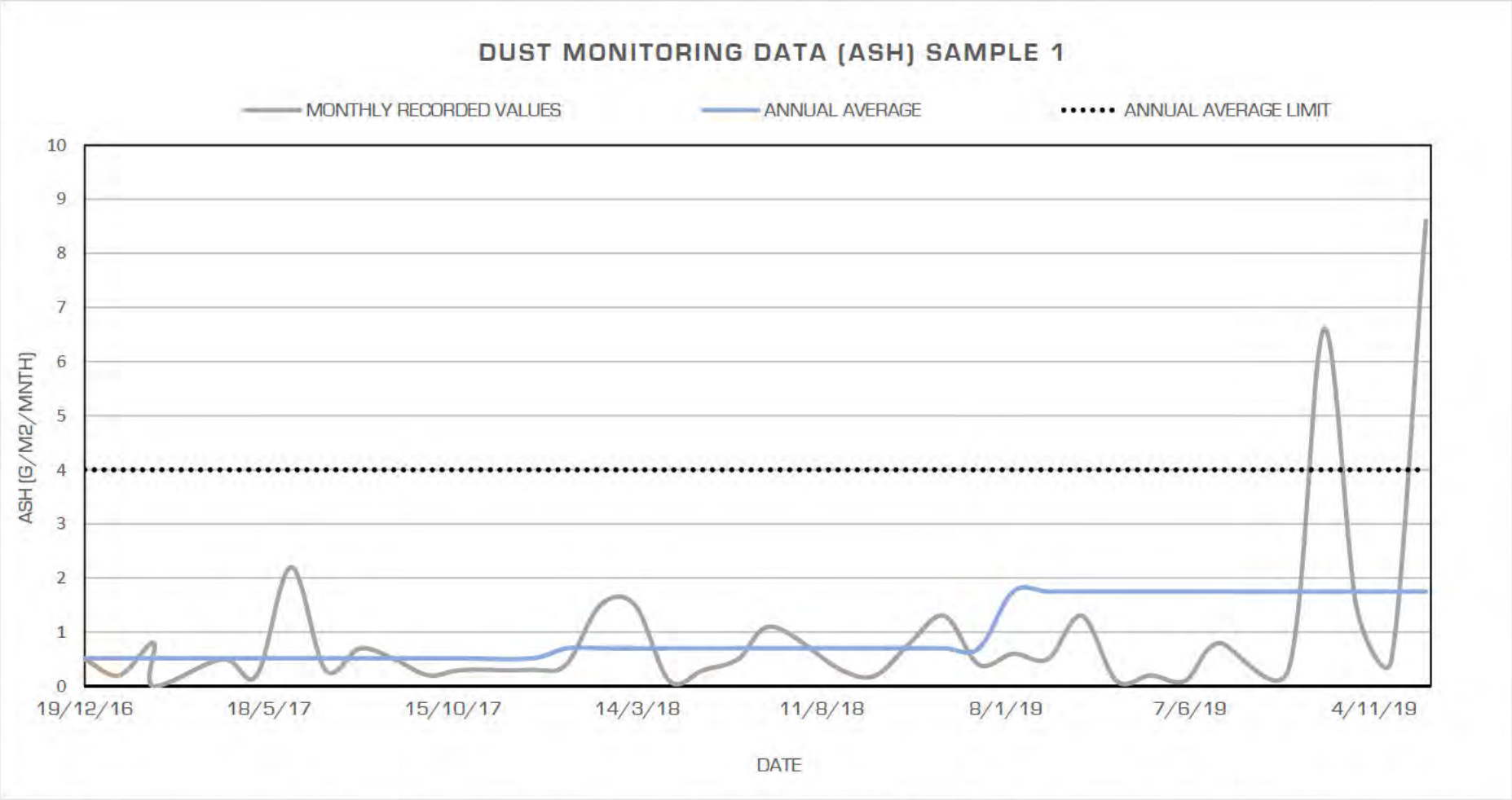
Not withstanding the above, as indicated in **Table 1**, annual results comply with the applicable annual average suspended solids criteria of 4g/m²/month. It is noted that the 2019 Air Quality Management Plan confirms 'ash' as being the key measure for air quality associated with the Quarry.

Table 1 – Air Quality

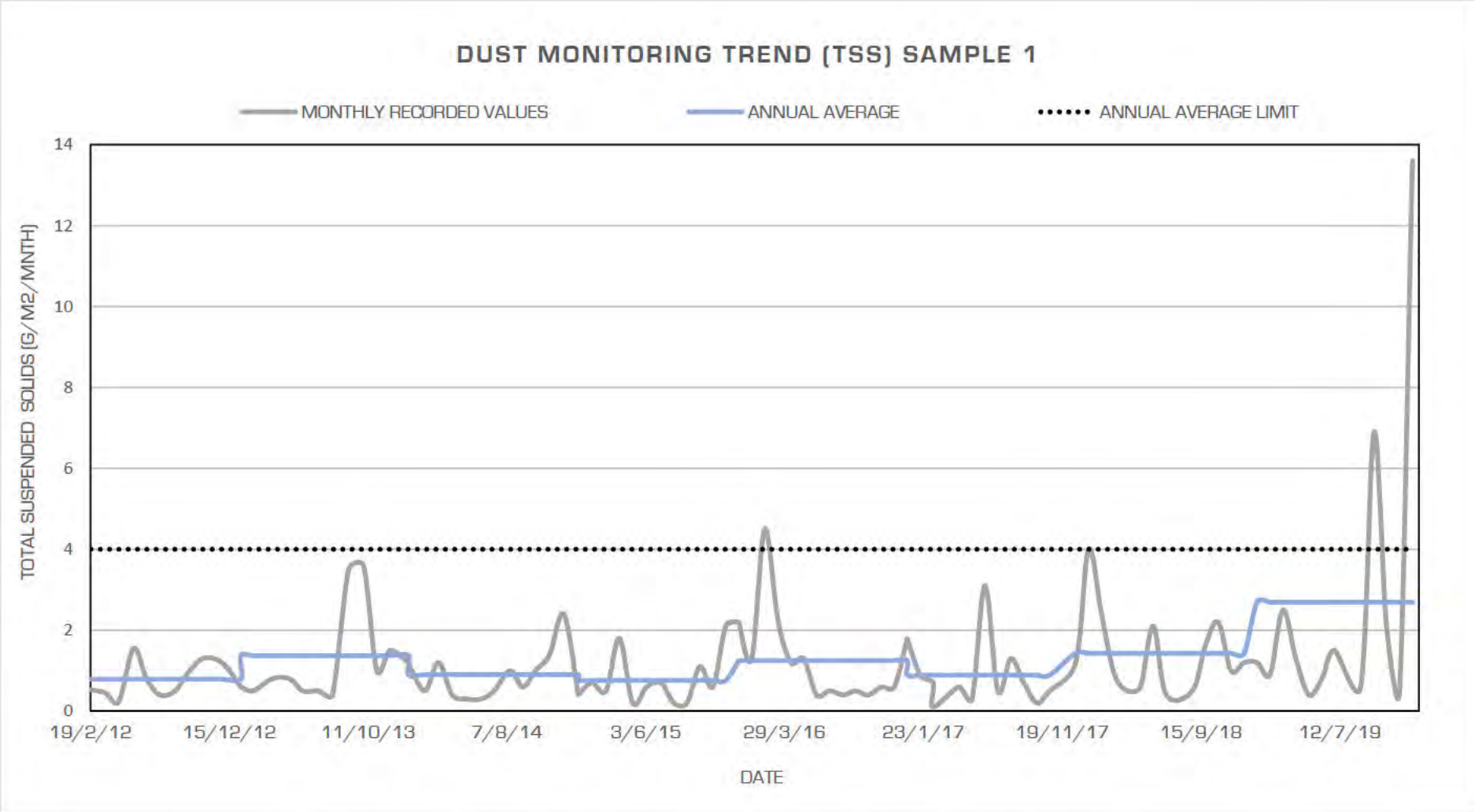
Pollutant	Averaging Period	Criterion	Blakebrook 2019 Results (Average)
Particulate Matter < 10 µm (PM10)	Annual	25 µg/m³	[1]NA
Particulate Matter < 10 µm (PM10)	24 Hour	50 µg/m³	[1]NA
Total suspended particulates (TSP)	Annual	90 µg/m³	[1]NA
Deposited Dust	Annual	Max 4g/m²/month	**Ash**
			1.15 < 4

The following charts illustrate the data associated with the following:

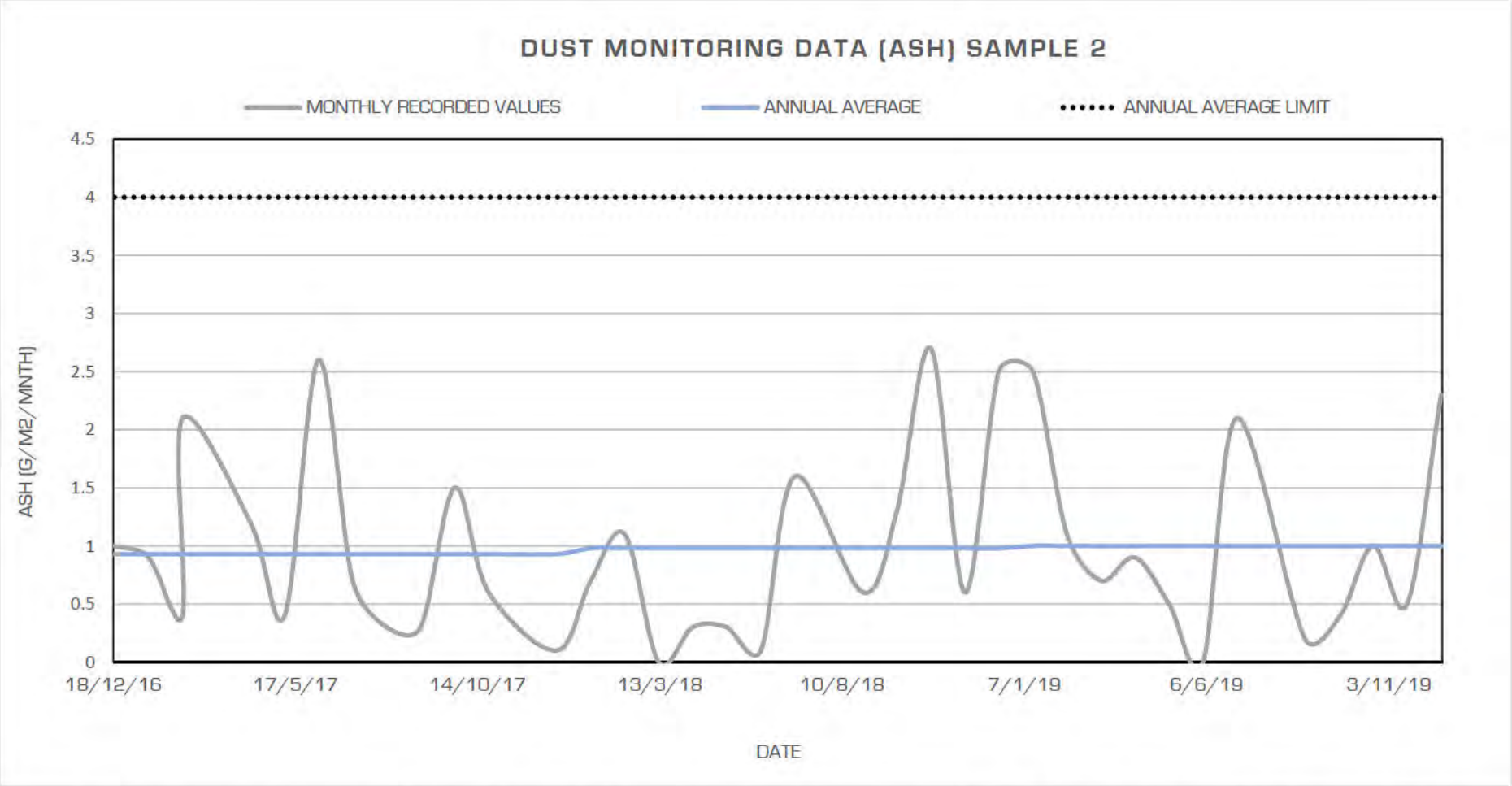
- Dust Monitoring Data (Ash 2017 - 2019) Sample 1
- Dust Monitoring Data (TSS 2012 - 2019) Sample 1
- Dust Monitoring Data (Ash 2017 - 2019) Sample 2
- Dust Monitoring Data (TSS 2012 - 2019) Sample 2
- Dust Monitoring Data (Ash 2017 - 2019) Sample 3
- Dust Monitoring Data (TSS 2012 - 2019) Sample 3



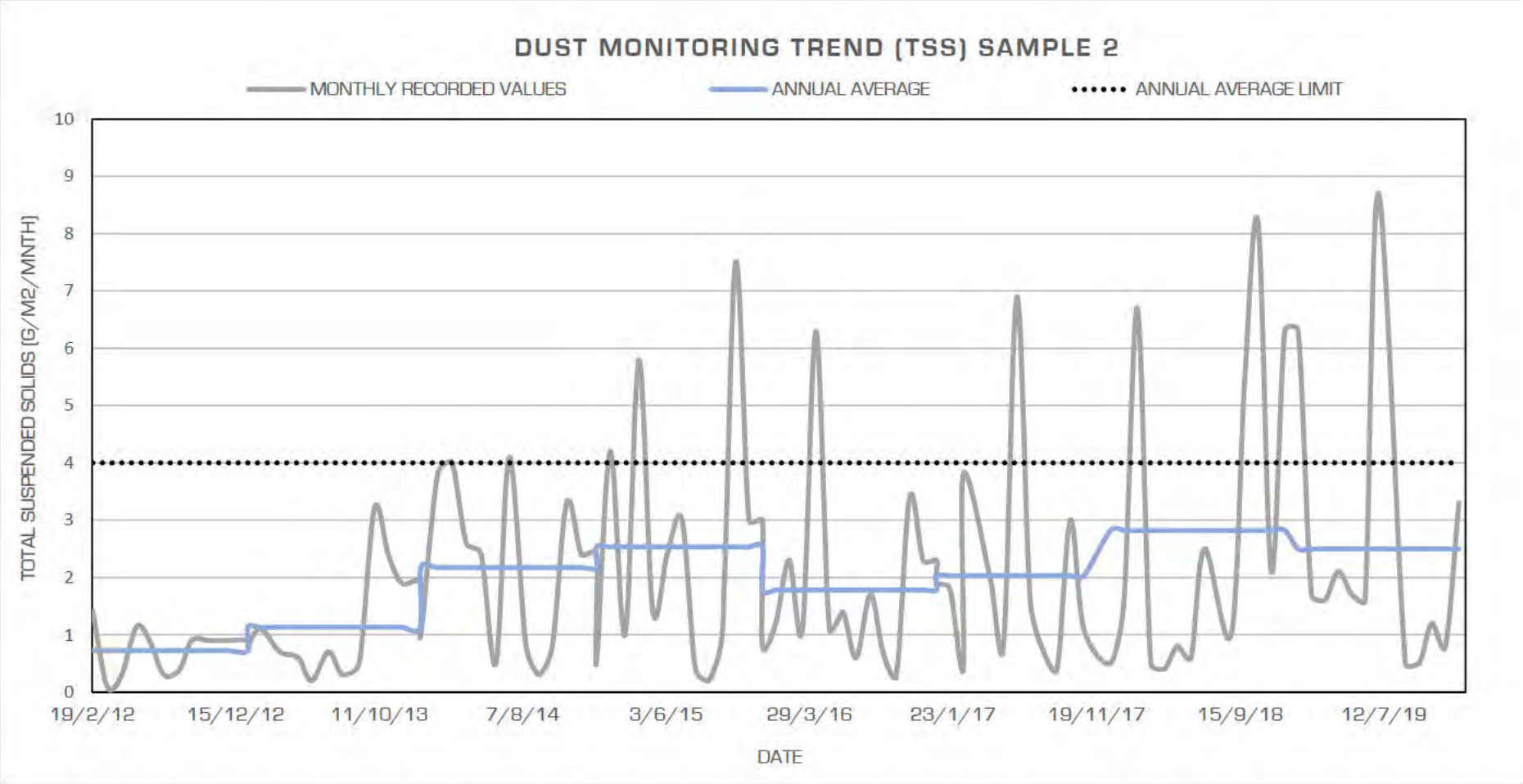
Notes: The above represents the total collected Ash per g/m²/month between the years of 2017 – 2019 at Sample Point 1. The annual average of the recorded values are well below the acceptable annual limit of 4g/m²/month, however during September and December of 2019 the ash limit exceeded 4g/m²/month. Due to the nature and composition of the hard rock resource, and the many pollutants that can makeup 'insoluble solids', ash will be used as the indicator of quarry dust contribution at Sample Point 1 (Air Quality Management Plan V 3.1).



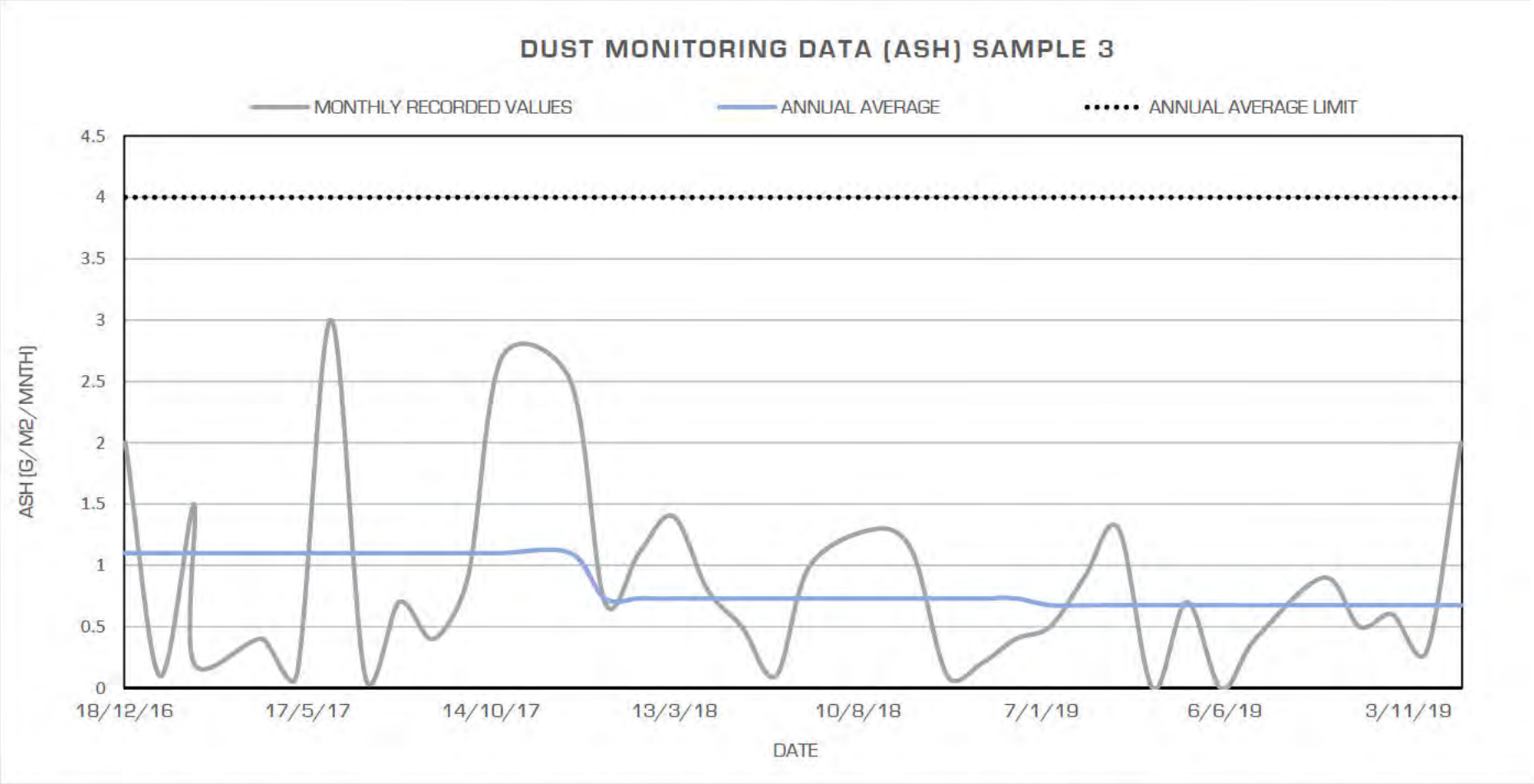
Notes: The above represents the Total Suspended Solids (TSS) collected monthly from 2012 – 2019 at Sample Point 1, as completed historically by LCC. This arrangement was an oversight, as the earlier Air Quality Management Plan (2011) states that the deposited dust result is to be taken using the 'ash' result (rather than TSS). However, for the purpose of consistency between AEMRs a trend graph has been provided for the TSS.



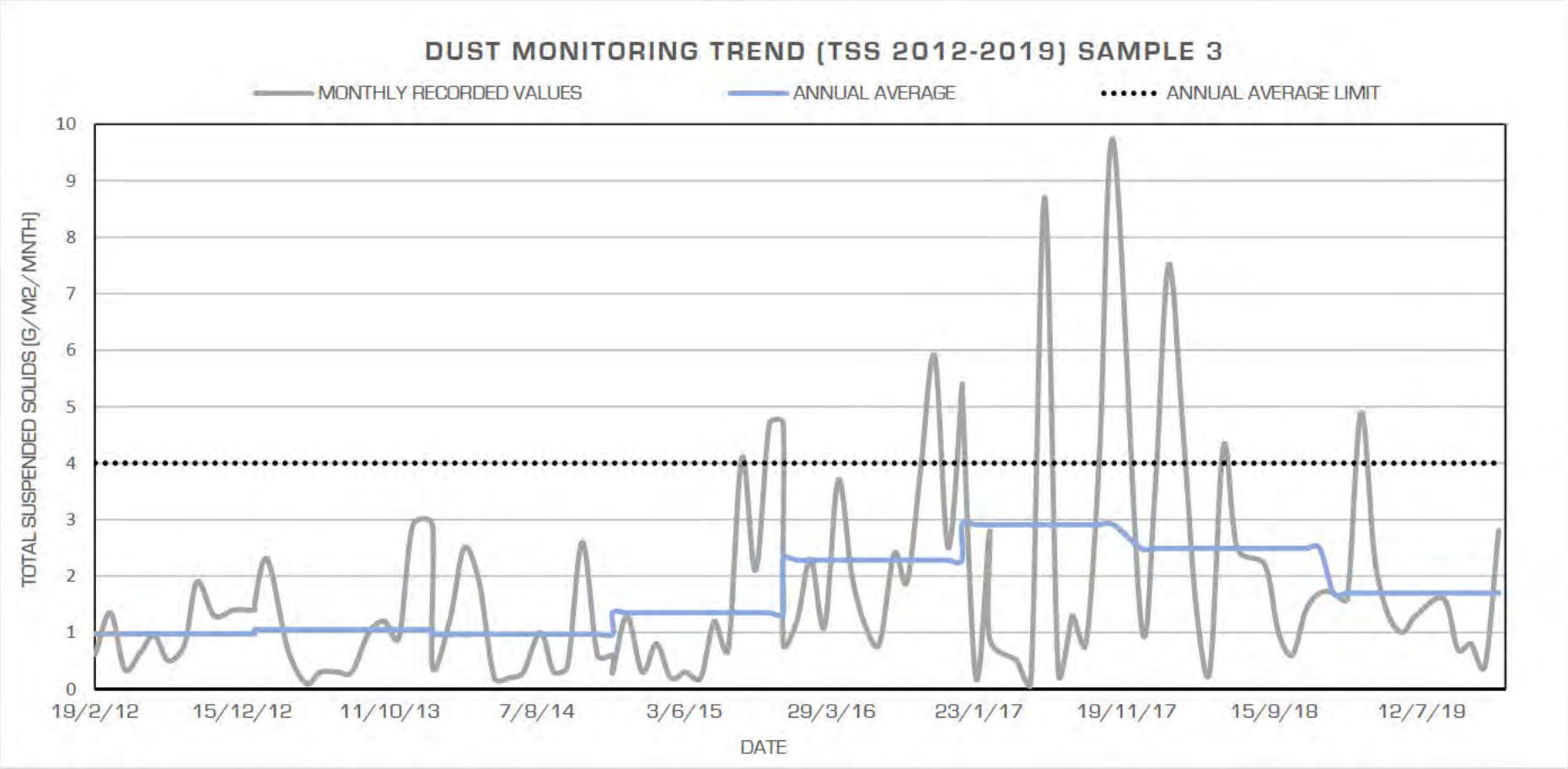
Notes: The above represents the total collected Ash per g/m²/month between the years of 2017 – 2019 at Sample Point 2, which are all well below the acceptable limit of 4g/m²/month. Due to the nature and composition of the hard rock resource, and the many pollutants that can make up 'insoluble solids', ash will be used as the indicator of quarry dust contribution at Sample Point 2 (Air Quality Management Plan V.3.1).



Notes: The above represents the Total Suspended Solids (TSS) collected monthly from 2012 – 2019 at Sample Point 2, as completed historically by LCC. This arrangement was an oversight, as the earlier Air Quality Management Plan (2011) states that the deposited dust result is to be taken using the 'ash' result (rather than TSS). However, for the purpose of consistency between AEMRs a trend graph has been provided for the TSS.



Notes: The above represents the total collected Ash per g/m²/month between the years of 2017 – 2019 at Sample Point 3, which are all well below the acceptable limit of 4g/m²/month. Due to the nature and composition of the hard rock resource, and the many pollutants that can make up 'insoluble solids', ash will be used as the indicator of quarry dust contribution at Sample Point 3 (Air Quality Management Plan V.3.1).



Notes: The above represents the Total Suspended Solids (TSS) collected monthly from 2012 – 2019 at Sample Point 3, as completed historically by LCC. This arrangement was an oversight, as the earlier Air Quality Management Plan (2011) states that the deposited dust result is to be taken using the 'ash' result (rather than TSS). However, for the purpose of consistency between AEMRs a trend graph has been provided for the TSS.

OPERATING CONDITIONS

Schedule 3 – Condition 11 (Air Quality Management)

Condition

The Proponent must:

(a) implement best practice management to minimise the dust emissions of the project;

(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 approval;

(c) minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events (see note d under Table 4);

(d) monitor and report on compliance with the relevant air quality conditions in this approval; and

(e) minimise the area of surface disturbance and undertake progressive rehabilitation of the site, to the satisfaction of the Secretary.

Compliance Statement

The updated the Air Quality Management Plan incorporates suitable management measures relating to the above matters.

AIR QUALITY - MANAGEMENT PLAN

Schedule 3 - Condition 12 (Air Quality Management Plan)

Condition

The Proponent must prepare an Air Quality Management Plan for the project to the satisfaction of the Secretary. This plan must:

(a) be submitted to the Secretary for approval within 3 months of the determination of Modification 1, unless otherwise agreed by the Secretary;

(b) describe the measures to be implemented to ensure: compliance with the air quality criteria and operating conditions of this approval; best practice management is being employed; and the air quality impacts of the project are minimised during adverse meteorological conditions and extraordinary events;

(c) describe the proposed air quality management system;

(d) include an air quality monitoring program that: is capable of evaluating the performance of the project; includes a protocol for determining any exceedances of the relevant conditions of approval; and effectively supports the air quality management system.

The Proponent must implement the approved Air Quality Management Plan as approved from time to time by the Secretary.

Compliance Statement

An updated Air Quality Management Plan for the Quarry was submitted and endorsed by DPE in 2018.

METEOROLOGICAL MONITORING

Schedule 3 – Condition 13 (Weather Station)

Condition

For the life of the project, the Proponent 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 and Analysis of Air Pollutants in New South Wales guidelines.

Compliance Statement

A meteorological weather station was installed on site in 2018.

GREENHOUSE GAS EMISSIONS

Schedule 3 - Condition 14 (Greenhouse Gas Emissions)

Condition

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

Compliance Statement

The vehicle fleet associated with the quarry, currently focuses on achieving US EPA Tier 3 Emission Standards and, where possible within budget limitations, aspires to Tier 4.

WATER SUPPLY

Schedule 3 - Condition 15 (Water Supply)

Condition

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

Compliance Statement

No water was required to be imported to the site in 2019.

WATER DISCHARGES

Schedule 3 - Condition 16 (Water Discharge)

Condition

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

Compliance Statement

No water discharge has occurred in the 2019 calendar year.

GROUNDWATER ASSESSMENT

Schedule 3 - Condition 17 (Groundwater Assessment)

Condition

The Proponent must undertake a detailed groundwater assessment to the satisfaction of the Secretary. This assessment must be:

(a) prepared by a suitably qualified expert in consultation with DPI Water;

(b) submitted to the Secretary for approval by 30 December 2018;

(c) approved by the Secretary before any extraction below 105 m AHD in the northern pit or below 118.5 m AHD in the southern pit;

(d) adequately assess groundwater resources affected by the northern and southern pits, to the proposed full extraction depths of those pits;

(e) adequately assess all groundwater impacts associated with proposed extraction;

(f) provide data for predicted groundwater pit inflows during and following extraction; and

(g) propose management measures to address pit inflows and impacts to groundwater resources.

The Proponent must implement the management measures proposed in the groundwater assessment to the satisfaction of the Secretary.

Compliance Statement

a) Ground Water Assessment

The Ground Water Assessment Report was submitted and approved by DPE in June / July 2019. Following consideration of the Report, the Department of Industry (Lands and Water) and the DPE required Council to obtain:

> *"the necessary Water Access Licences (WALs) for the extraction of groundwater up to the predicted maximum annual take of 70ML per annum from the North Coast Volcanics Ground Water Source and the North Coast Fractured and Porous Rock Groundwater*

Sources. The Department requests that this process commence no later than 9 July 2019 and to be notified once the required WALs have been obtained".

The initial application for a Water Access Licence was made on 9 July 2019. On 12 November 2019, a formal application was made via the Controlled Allocation Order, 3rd period RO1 process for 70 Unit Shares from the North Coast Volcanics Groundwater Source at the rate of $550 per share.

LCC was notified of a successful outcome on 7 January 2020. Shares were paid in full on 2 March 2020. Further detail in this regard will be provided in the 2020 AEMR.

SOIL AND WATER MANAGEMENT

Schedule 3 - Condition 18 (Intercept of Groundwater)

Condition

If groundwater is encountered during quarrying operations in the South Pit under EA (Mod 1), the Proponent must cease quarrying operations until authorised to recommence by the Secretary.

Compliance Statement

Groundwater was not encountered during the operation of the Quarry in 2019.

Schedule 3 - Condition 19 (Soil and Water Management Plan)

Condition

The Proponent must prepare a Soil and Water Management Plan for the project to the satisfaction of the Secretary. This plan must:

(a) be prepared by suitably qualified and experienced person/s approved by the Secretary;

(b) be prepared in consultation with the EPA and DPI Water;

(c) be submitted to the Secretary for approval within 3 months of the determination of Modification 1, unless otherwise agreed by the Secretary; and

(d) include a:

(i) Site Water Balance that includes:

details of:

- *sources and security of water supply;*
- *water use and management onsite;*
- *any off-site water transfers; and*
- *reporting procedures; and*
- *measures to be implemented to minimise clean water use on site;*

(ii) Surface Water Management Plan, that includes:

- *a program for obtaining detailed baseline data on surface water flows and quality in water bodies that could potentially be affected by the project;*
- *a detailed description of the surface water management system on site including the:*
- *clean water diversion system;*
- *erosion and sediment controls;*
- *dirty water management system; and*
- *water storages; and*
- *a program to monitor and report on:*
    - *any surface water discharges;*
    - *the effectiveness of the water management system,*
    - *the quality of water discharged from the site to the environment;*
    - *surface water flows and quality in local watercourses;*

(iii) Groundwater Management Plan that includes:

- *a provision that requires the Proponent to obtain appropriate water licence(s) to cover the volume of any unforeseen groundwater inflows into the quarry from the quarry face or floor; and*
- *a monitoring program to manage potential impacts, if any, on any alluvium and associated surface water source near the proposed extraction area that includes:*
    - *identification of a methodology for determining threshold water level criteria;*
    - *contingency measures in the event of a breach of thresholds; and*
    - *a program to regularly report on monitoring.*

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

Compliance Statement

a) Soil and Water Management Plan

The updated Soil and Water Management Plan (December 2018) was submitted on 5 March 2019 and approved by DPE on 25 June 2019.

b) Site Water Balance

The updated Soil and Water Management Plan incorporates a Site Water Balance (February 2019), a copy of which is provided on the LCC web site.

The Site Water Balance (SWB) advises that:

> *"The modelling results show that for predicted future conditions, the main dam will provide sufficient supply to service all water demands within the quarry throughout the full range of modelled climatic conditions, with a minimum estimated storage volume of 26.4 ML (or 3.6 ML below full capacity) throughout the model period. This indicates that a reduced dam capacity is feasible for future quarry operations without compromising reliability of supply. Further investigations will be required at such a time when quarry works progress to the*

point that the current dam required decommissioning and replacement to investigate the intermediate conditions (groundwater inflows, seepage etc.) as the modelling described above only reflects the ultimate stage of the quarry operations."

The report goes on provide a series of recommendations to improve the accuracy of the Site Water Balance estimates. With respect to these recommendations, our client advises

"With reference to p35, recommendations for existing quarry operations:

- *weather station installed;*
- *daily log of water truck activity being kept as per site checklist;*
- *flow meter on outlet of tank installed;*
- *water level in sediment basin being monitored daily as per checklist;*
- *water level in main dam being monitored daily as per site checklist;*
- *pumps on site and being maintained by Fleet team;*
- *pumps being tested as per site checklist;*
- *data being stored in TRIM; and*
- *revised Site Water Balance budgeted in first quarter FY20/21."*

c) Surface Water Monitoring Results

Monitoring Stations

Plate 2 provides an extract from the Soil and Water Management Plan which identifies the locations of the required monitoring points.

With respect to the frequency of monitoring, we note that SW5 is required to be monitored only if LPD3 comes on line. As this sediment basin is not yet a Licenced Point of Discharge no monitoring has occurred from this point.

Plate 2 – Water Sampling Points

Sampling Results - SW1, SW2 & SW3

Sampling was completed as illustrated in **Table 2**.

Table 2 – Water Sampling Dates

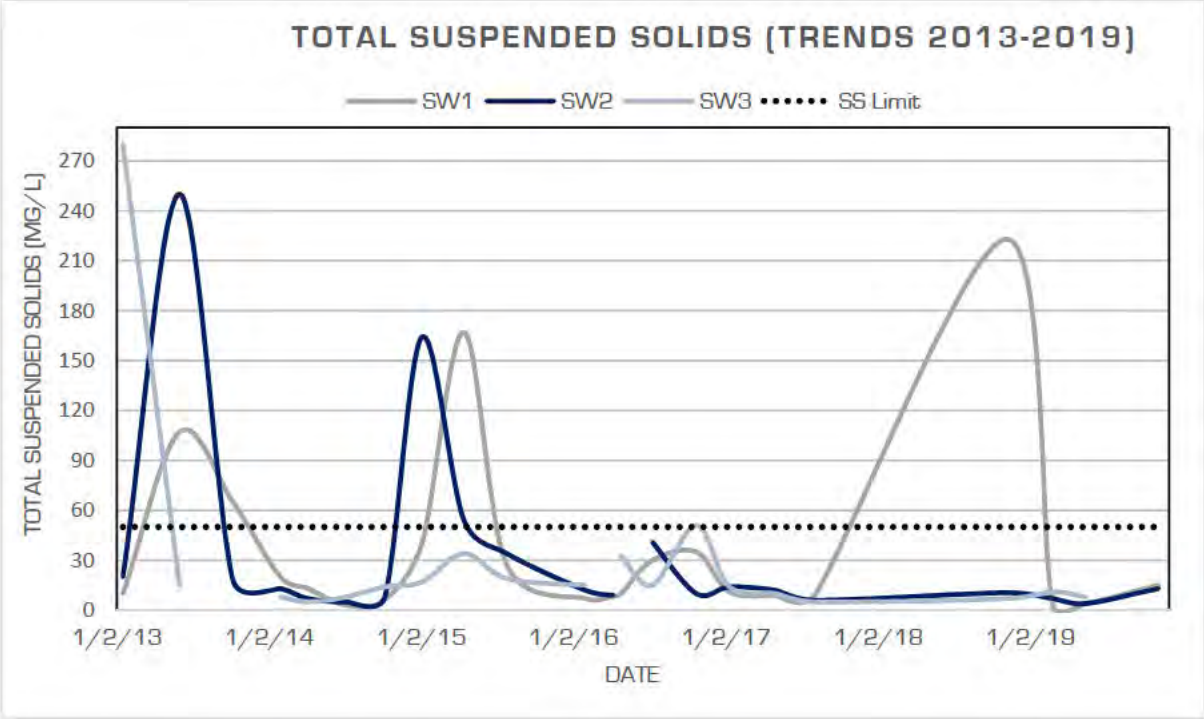
	26 /03/19	13/06/19	02/09/19	05/12/19
BQSW1	Y	Y	Y	Dry
BQSW2	Y	Y	Y	Y
BQSW3	Y	Y	Y	Y

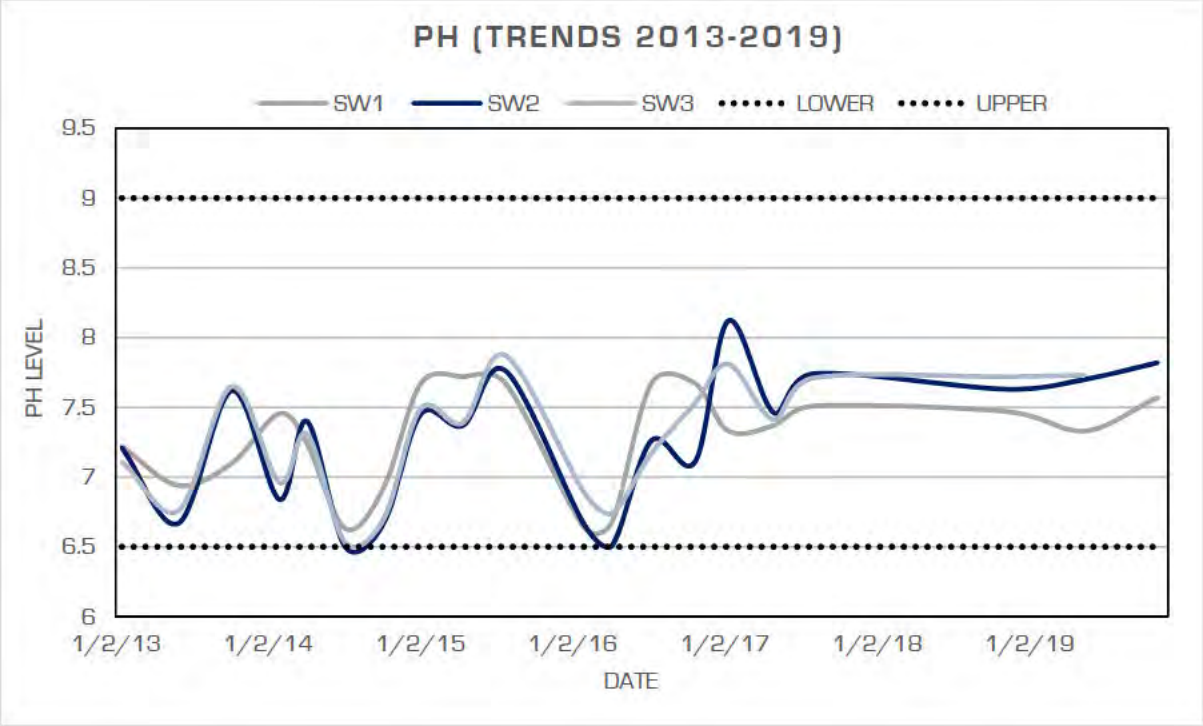
With respect to December 2019, records indicate that BQSW 1 location was dry and therefore testing could not occur. Results then reference 'Sample 1 BQSW2' and 'Sample 2 BQSW'. Given that BQSW1 was dry, it is assumed that Sample 2 therefore relates to BQSW3.

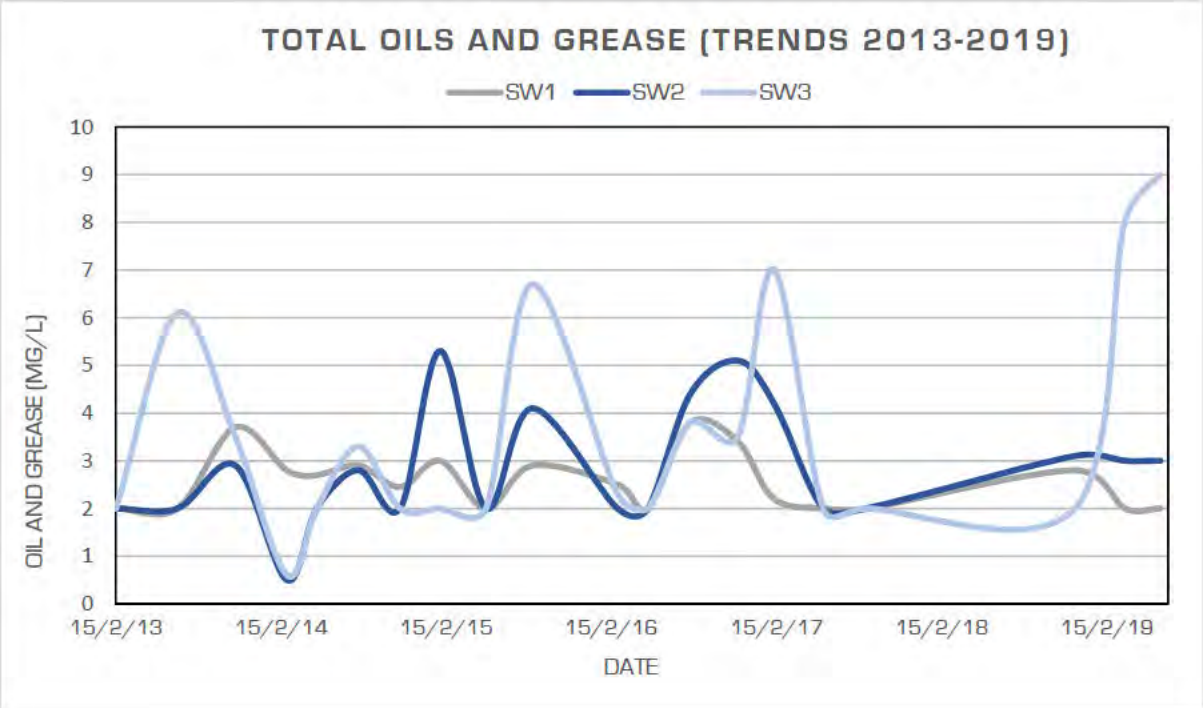
Attachment 9 documents the full monitoring results. whilst the tables and figures below illustrate the key reporting parameters of pH, Total Suspended Solids (TSS), and Oil & Grease for the years 2013 – 2019.

Table 3 – Surface Water Monitoring

Analysis	ANZECC (Trigger Values for Freshwater)	Blakebrook Quarry 2019 (Average results)
pH units	6.5-9.0	7.630
Conductivity (µs/cm)	1500	411
Nitrate (NO_3)	0.7	0.030
Aluminium (A1)	0.055	NA
Total Arsenic (As)	0.024	NA
Cadmium (Cd)	0.0002	NA
Chromium (Cr)	n/s	NA
Copper (Cu)	0.0014	NA
Mercury (Hg)	0.0006	NA
Nickel (Ni)	0.011	NA
Oil and Grease	No visible sheen or detectable odour	4.5mg/L
Total Suspended Solids (mg/L)	50	14.250
Lead (Pb)	0.0034	NA
Zinc (Zn)	0.008	NA




PH (TRENDS 2013-2019)
SW1
SW2
SW3
LOWER
UPPER
9.5
9
8.5
8
7.5
7
6.5
6
PH LEVEL
1/2/13
1/2/14
1/2/15
1/2/16
1/2/17
1/2/18
1/2/19
DATE


TOTAL OILS AND GREASE (TRENDS 2013-2019)
SW1
SW2
SW3
10
9
8
7
6
5
4
3
2
1
0
OIL AND GREASE (MG/L)
15/2/13
15/2/14
15/2/15
15/2/16
15/2/17
15/2/18
15/2/19
DATE

Sampling Results - SW4

SW4 is typically sampled only at time of water discharge. No discharge has occurred in 2019 and, accordingly, no records are provided for this sampling point. We note that following adoption of the S&WMP in March 2019, SW4 no longer needs to be monitored. Accordingly, no reference will be made to SW4 in future AEMRs.

Trends and Observations

The results for 2019 broadly fit within the trends of 2013 – 2018. In interpreting the results longer term, it is particularly noted that 2019 represented a particularly dry period for the Northern Rivers region.

d) Ground Water Monitoring Results & Notices of Exceedance

Quarterly ground water monitoring was completed at 9 sampling points on the following occasions:

- 13 March 2019;
- 13 June 2019;
- 5 September 2019; and
- 5 December 2019.

Results are summarised within the table below. The groundwater monitoring results indicated that (to varying degrees) the sample results exceeded the trigger levels relating to pH, conductivity, Total Dissolved Salts and various metals relative to ANZECC and NHMRC Drinking Water Standards.

The March 2019 exceedance was reported to DPE as required pursuant to Schedule 5 Condition 6. However, the June, September and December results were not. The lack of reporting is in accordance with the framework of the updated and approved SWMP for the site which provide for the collation of site-specific background water quality parameters to determine appropriate trigger limits for the site.

As part of the notification processes for March, a copy of the report titled 'Bioregional Assessment of Water Resources of Clarence Bioregion' (**Attachment 11**) was provided to DPE. As advised in previous AEMRs, this assessment demonstrates that the majority of the monitoring results for the site are below the maximum ranges found within the groundwater of basalt geology of the region. As such, the exceedances are considered to be the result of the natural geological environment. The monitoring regime currently underway will assist to confirm (or otherwise) this conclusion.

Sample Point	Date	pH	Conductivity (EC) (dS/m)	Total Suspended Solids (mg/L)	Total oils & grease (mg/L)	Nitrate (mg/L/N)	Silver (mg/L)	Aluminium (mg/L)	Arsenic (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Iron (mg/L)	Manganese (mg/L)	Nickel (mg/L)	Lead (mg/L)	Selenium (mg/L)	Zinc (mg/L)	Mercury (mg/L)
ANZECC Trigger Values for Freshwater		6.5-9.0	1.5			0.7		0.055	0.024	0.0002		0.0014			0.0011	0.0034		0.008	0.0006
NHMRC Trigger Values for Drinking Water		6.5-8.5				50		0.2	0.007	0.002		2			0.02	0.01		3	0.001
GW1 BQS1-S	13/03/2019	7.08	0.502	412.9	<2	0.022	<0.010	1.771	<0.001	<0.001	0.003	0.009	7.169	0.249	0.014	0.003	<0.002	0.047	<0.0005
	13/06/2019	6.87	0.363		<2	0.028		0.271					1.208	0.18		<0.001			
	5/09/2019	6.75	0.394	180	2	0.012		0.049					4.727	0.193		0.002			
	5/12/2019	7.28	0.547	340	3	0.012		0.009					0.024	0.143		0.005			
GW2 BQS1-I	13/03/2019	8.22	1.604	317	6	0.005	<0.010	0.696	0.001	<0.001	0.001	0.004	2.34	0.123	0.003	0.002	<0.002	0.075	<0.0005
	13/06/2019	8.16	1.373		<2	0.01		0.354					0.19	0.097		0.001			
	5/09/2019	8.1	1.498	39	<2	0.019		<0.005					0.358	0.066		<0.001			
	5/12/2019	8.14	1.552	39	3	<0.005		0.005					0.009	0.045		0.001			
GW3 BQS1-D	13/03/2019	8.18	1.841	239	9	0.016	<0.010	0.518	0.001	<0.001	0.002	0.004	1.63	0.05	0.007	0.003	<0.002	0.049	<0.0005
	13/06/2019	8.22	1.608		3	0.472		1.843					8.452	0.134		0.006			
	5/09/2019	8.3	1.758	96	<2	0.051		0.011					0.005	0.024		0.003			
	5/12/2019	8.06	1.768	73	3	0.06		0.015					0.01	0.023		0.002			
GW4 BQN1-B	13/03/2019	7.17	1.157	1	9	<0.005	<0.010	0.003	0.002	<0.001	<0.001	0.003	1.91	0.156	<0.001	<0.001	<0.002	0.005	<0.0005
	13/06/2019	7.12	1.022		<2	<0.005		<0.005					1.881	0.15		<0..001			
	5/09/2019	7.08	1.104	3	<2	<0.005		<0.005					2.053	0.152		<0.001			
	5/12/2019	8.06	1.49	148	3	0.012		0.002					0.012	0.151		0.003			
GW5 BQN1-A	13/03/2019	9.57	2.023	166	9	0.143	<0.010	2.19	0.001	<0.001	0.007	0.012	2.29	0.115	0.007	0.002	<0.002	0.031	<0.0005
	13/06/2019	9.53	1.738		<2	0.133		2.661					2.822	0.116		<0.001			
	5/09/2019	9.12	1.899	107	<2	0.079		0.006					1.432	<0.001		<0.001			
	5/12/2019	8.68	1.943	92	6	0.061		0.005					0.003	0.002		0.001			
GW6 BQN1-D	13/03/2019	8.87	1.472	34	4	0.015	<0.010	0.923	0.004	<0.001	0.004	0.151	3.52	0.048	0.008	0.001	<0.002	0.05	<0.0005
	13/06/2019	8.9	1.269		3	0.037		0.581					2.182	0.04		<0.001			
	5/09/2019	8.91	1.403	52	<2	0.052		0.011					3.755	0.008		<0.001			
	5/12/2019	8.41	1.353	44	35	0.069		0.011					0.006	0.007		<0.001			
GW7 BQN2-B	13/03/2019	10.41	1.103	87	3	0.201	<0.010	0.615	0.003	<0.001	0.003	0.005	0.526	0.024	0.003	0.001	<0.002	0.025	<0.0005
	13/06/2019	11.02	1.019		<2	0.029		0.521					0.237	0.013		<0.001			
	5/09/2019	9.35	1.117	24	2	0.048		0.01					0.101	0.007		<0.001			
	5/12/2019	9.54	1.055	70	3	0.096		0.015					0.005	0.006		0.001			
GW8 BQN2-A	13/03/2019	7.98	1.11	13	5	0.072	<0.010	0.097	0.003	<0.001	0.001	0.007	0.253	0.066	0.007	0.001	<0.002	0.019	<0.0005
	13/06/2019	8	0.823		3	0.031		0.112					0.201	0.04		<0.001			
	5/09/2019	7.95	1.153	4	7	0.057		0.006					0.155	0.043		<0.001			
	5/12/2019	8.2	0.905	8	2	0.03		0.009					0.052	0.043		<0.001			
GW9 BQN2-D	13/03/2019	8.99	0.98	24	2	0.108	<0.010	0.128	0.002	<0.001	0.001	0.005	0.294	0.019	0.003	<0.001	<0.002	0.027	<0.0005
	13/06/2019	8.93	0.885		4	0.077		0.648					2.043	0.036		0.002			
	5/09/2019	8.92	0.929	26	<2	0.037		0.005					<0.005	0.004		<0.001			
	5/12/2019	8.98	0.946	308	3	0.088		0.013					0.007	0.003		0.001			

TRANSPORT

MONITORING OF PRODUCT TRANSPORT

Schedule 3 - Condition 20 (Record of Truck Movements)

Condition

The Proponent must keep accurate records of all laden truck movements to and from the site (including time of arrival and dispatch) and publish a summary of records on its website every 6 months.

Compliance Statement

Suitable records are available indicating the laden truck movements to the site. A review of the LCC Website on 25 February 2020 indicates that records are provided for the 2019 calendar year.

ROAD UPGRADES

Schedule 3 - Condition 21 (Road Upgrades)

Condition

The Proponent must undertake the following road upgrade works generally in accordance with the

recommendations in the EA, and to the satisfaction of the RMS:

a) upgrade the intersection of the Quarry Access and Nimbin Road to a 'Type AUR Intersection Treatment', prior to 31 December 2010;

b) upgrade the guard rails on the approaches to Booerie Creek Bridge prior to 31 December 2010;

c) upgrade the Booerie Creek Road and Nimbin Road intersection to a 'Type BAR Right Turn Treatment on the Through Road' prior to 31 December 2010;

d) upgrade the Wilson Street and Nimbin Road intersection to a 'Type CHR Right Turn Bay Treatment' prior to 31 December 2010; and

e) re-align Nimbin Road and the Quarry Access intersection to meet the AUSTROADS sight distance requirements for vehicles travelling in both directions through the intersection prior to 31 December 2011.

Note: The road works must be constructed in accordance with the relevant RMS or AUSTROADS standards, and signposted and lit in accordance with AS:1742 – Manual of Uniform Traffic Control Devices and AS/NZ 1158:2005 – Lighting for Roads and Public Spaces.

Compliance Statement

All required roadworks were completed prior to 2019.

OPERATING CONDITIONS

Schedule 3 - Condition 22 (Road Upgrades)

Condition

The Proponent must:

(a) restrict truck movements from the quarry to an average of 50 laden trucks a day until all road upgrades works required by condition 20 of Schedule 3, are met or unless otherwise approved by the Secretary;

(b) 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;

(c) ensure that all laden trucks exiting the site are cleaned of material that may fall from vehicles, before leaving the site; and

(d) use its best endeavours to ensure that appropriate signage is displayed on all trucks used to transport product from the project so they can be easily identified by road users.

Compliance Statement

All roadworks referenced in Item (a) are complete.

The Operational Traffic Management Plan (refer Schedule 3 Condition 3.23) includes measures to address Items (b), (c) and (d).

TRAFFIC MANAGEMENT PLAN

Schedule 3 - Condition 23 (Traffic Management Plan)

Condition

The Proponent must prepare a Traffic Management Plan for the project 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 3 months of the determination of Modification 1, unless otherwise agreed by the Secretary;

c) describe the processes in place for the control of truck movements entering and exiting the site;

d) include a Drivers' Code of Conduct that details the safe and quiet driving practices that must be used by drivers transporting products to and from the quarry;

e) describe the measures to be put in place to ensure compliance with the Drivers' Code of Conduct; and

f) propose measures to minimise the transmission of dust and tracking of material onto the surface of the public road from vehicles leaving the quarry.

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

Compliance Statement

LCC updated the Operational Traffic Management Plan for the Quarry was submitted and endorsed by the DPE in 2018.

ABORIGINAL HERITAGE MANAGEMENT PLAN

Schedule 3 - Condition 24 (Aboriginal Heritage Management Plan)

Condition

The Proponent must prepare an Aboriginal Heritage Management Plan for the project 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 3 months of the determination of Modification 1, unless otherwise agreed by the Secretary; and

(d) include a description of the measures that would be implemented to:

- *protect, monitor and manage known sites of archaeological significance;*
- *manage any new Aboriginal objects or relics that are discovered;*
- *store Aboriginal heritage items salvaged on site; and*
- *ensure ongoing consultation and involvement of the Registered Aboriginal Parties in the conservation and management of Aboriginal cultural heritage on the site.*

The Proponent must implement the approved Aboriginal Heritage Management Plan as approved from time to time by the Secretary.

Compliance Statement

The updated the Aboriginal Heritage Management Plan for the Quarry was submitted and endorsed by the DPE in 2018.

Schedule 3 - Condition 25 (Aboriginal Heritage)

Condition

If any item or object of Aboriginal heritage significance is identified on site, the Proponent must ensure that:

(a) all work in the immediate vicinity of the suspected Aboriginal item or object ceases immediately;

(b) a 10 m buffer area around the suspected item or object is cordoned off; and

(c) the OEH is contacted immediately.

Work in the immediate vicinity of the Aboriginal item or object may only recommence in accordance with the provisions of Part 6 of the National Parks and Wildlife Act 1974.

Compliance Statement

LCC advises that no items or objects of Aboriginal Cultural Heritage significance were identified in 2019. The updated the Aboriginal Heritage Management Plan (refer Condition 3.25) includes an Unexpected Finds Procedure, which will further guide staff actions in the event that an item or object of Aboriginal Cultural Heritage is discovered.

BIODIVERSITY OFFSET STRATEGY

Schedule 3 – Condition 5 (Habitat Offsets)

(Note: Condition numbering appears to be an error within the Notice of Determination)

Condition

The Proponent must:

(a) implement the Biodiversity Offset Strategy (see Table 5);

(b) ensure that adequate resources are dedicated towards the implementation of this strategy;

(c) provide appropriate long term security for the offset area; and

(d) provide a timetable for the implementation of the offset strategy prior to 30 June 2010, or as otherwise agreed by the Secretary, to the satisfaction of the Secretary.

Table 5: Biodiversity Offset Strategy

Offset Areas	***Minimum Size***
On-site offset (Protection Zone in Appendix 4)	17.6 hectares
Off-site offset (within Lismore local government area, and not already within a conservation area)	45 hectares
Total	62.6 hectares

Note: Mechanisms to provide appropriate long-term security to the land within the Biodiversity Offset Strategy in accordance with the NSW Biodiversity Offset Policy for Major Projects 2014, include a BioBanking Agreement, Voluntary Conservation Agreement or an alternative mechanism that provides for a similar conservation outcome.

Compliance Statement

The 45ha offset area has been secured and now forms part of the Quarry boundaries.

REHABILITATION OBJECTIVES

Schedule 3 - Condition 26 (Rehabilitation Strategy)

Condition

The Proponent 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 6.

Table 6: Rehabilitation Objectives

Feature	Objective
All areas of the site affected by the project	• Safe • Hydraulically and geotechnically stable • Non-polluting • Fit for the intended post-mining land use(s) • Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and minimising visual impacts when viewed from surrounding land
Surface Infrastructure	• Decommissioned and removed, unless otherwise agreed by the Secretary
Quarry benches and pit floor	• 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

Compliance Statement

No site rehabilitation was required, or occurred, in 2019.

PROGRESSIVE REHABILITATION

Schedule 3 - Condition 27 (Progressive Rehabilitation)

Condition

The Proponent 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 future re-disturbance

Compliance Statement

No site rehabilitation was required, or occurred, in 2019.

Schedule 3 - Condition 28 (Biodiversity Management Plan)

Condition

The Proponent must prepare a Biodiversity and Rehabilitation Management Plan for the project to the satisfaction of the Secretary. This plan must:

(a) be prepared by a suitably qualified expert;

(b) be prepared in consultation with OEH and Council;

(c) be submitted to the Secretary for approval within 3 months of the determination of Modification 1, unless otherwise agreed by the Secretary;

(d) provide details of the conceptual final landform and associated land uses for the site;

(e) describe how the implementation of the Biodiversity Offset Strategy will be integrated with the overall rehabilitation of the site;

(f) include a Koala Management Plan prepared in accordance with SEPP 44;

(g) include detailed performance and completion criteria for evaluating the performance of the Biodiversity Offset Strategy and rehabilitation of the site (including progressive rehabilitation), including triggers for any necessary remedial action;

(h) describe the short, medium and long term measures to be implemented to:

- *manage remnant vegetation and habitat on site, including within the Biodiversity Offset Strategy area; and*
- *ensure compliance with the rehabilitation objectives and progressive rehabilitation obligations in this approval;*

(i) include a detailed description of the measures described in paragraph (h) to 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, including core Koala habitat;*
- *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;*

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

(k) identify the potential risks to the successful implementation of the Biodiversity Offset Strategy, and include a description of the contingency measures to be implemented to mitigate these risks; and

(l) include details of who is responsible for monitoring, reviewing, and implementing the plan.

The Proponent must implement the Biodiversity and Rehabilitation Management Plan as approved from time to time by the Secretary.

Compliance Statement

The Biodiversity Rehabilitation Management Plan was submitted to DPE in August 2018. In 2019, following the approval of the BOS, the BRMP was again amended and submitted to DPE for approval. This was subsequently approved on 14 March 2019.

BIODIVERSITY AND REHABILITATION BOND

Schedule 3 - Condition 29 (Biodiversity and Rehabilitation Bond)

Condition

Within 6 months of the approval of the Biodiversity and Rehabilitation Management Plan, the Proponent 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 approval. The sum of the bond must be determined by:

(a) calculating the full cost of implementing the Biodiversity Offset Strategy;

(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, 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 work.

Compliance Statement

The bond was reviewed in 2019. A sum of $2,163,177 was paid to DPE on 26 August 2019.

Schedule 3 – Condition 30 (Review of Biodiversity Bond)

Condition

Within 3 months of each Independent Environmental Audit (see Condition 12 of Schedule 5), the Proponent 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 project); and

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

Compliance Statement

The bond was reviewed in 2019. A sum of $2,163,177 was paid to DPE on 26 August 2019.

VISUAL

Schedule 3 – Condition 31 (Visual Impacts)

Condition

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

Compliance Statement

Quarry operations are located below the tree line and do not intrude on the landscape of visual character of the locality. LCC advises that they are not aware of any complaints with respect to visual impacts associated with the Quarry.

Schedule 3 – Condition 32 (Waste Management)

Condition

The Proponent 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 project;

(c) ensure that the waste generated by the project 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.

Compliance Statement

LCC advises that in 2019 waste management practices at the quarry involved the following:

- Waste generated by staff are separated into general waste and recyclables;
- Lismore City Council 'standard' waste collection service does not extend to the quarry. Accordingly, waste is delivered to the Wyrallah Road Waste Management Facility by quarry staff on an 'as needs' basis'.
- Used oil and chemicals (when applicable) drums / containers are transported to the Wyrallah Road Waste Management Facility by quarry staff on an 'as needs' basis'
- Crushed glass from the Wyrallah Road Waste Management Facility is mixed with quarry product road base. The EPA Licence has been varied to allow the acceptance of glass sand for this purpose.
- No waste (other than the glass product referenced above) is stored or processed on site.

Schedule 3 - Condition 33 (Waste Management)

Condition

Except as expressly permitted in an EPL, the Proponent must not receive waste at the site for storage, treatment, processing, reprocessing or disposal.

Compliance Statement

LCC advises that in 2019 the only waste product received and processed on the site is crushed glass, which is mixed with quarry product and sold for road base.

LIQUID STORAGE

Schedule 3 – Condition 34 (Storage of Liquids)

Condition

The Proponent 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.

Compliance Statement

LCC advises that in 2019 there were no changes to the former methods of storing liquids, namely:

- A 20,000 litre self bunded fuel tank is provided on site within a bessa block bund;
- Oils and lubricants are stored in suitable containers with self contained bunding; and
- Chemicals associated with the on-site laboratory are stored within suitable containers within a bunded shed.

DANGEROUS GOODS

Schedule 3 - Condition 35 (Dangerous Goods)

Condition

The Proponent 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.

Compliance Statement

Quarry stores include ethanol (for laboratory use), hydraulic and transmission fluids and oils. These liquids, in addition to diesel fuel, are stored as outlined in the assessment against Schedule 3 Condition 34.

BUSHFIRE

Schedule 3 - Condition 36 (Fire)

Condition

The Proponent must:

(a) ensure that the project is suitably equipped to respond to any fires on site; and

(b) assist the Rural Fire Service and emergency services to the extent practicable if there is a fire in the vicinity of the site.

Compliance Statement

LCC advises that in 2019:

- The quarry was equipped with both fire extinguishers and water carts, with this equipment maintained on a regular basis.;
- No fires occurred on the quarry grounds; and
- The quarry was requested by Fire and Rescue NSW to provide fire fighting support with respect to an emergency event to control a significant fire at the Lismore Waste Facility; and
- An 'Approaching Bushfire' emergency drill was held with staff at the monthly Safety Meeting on 31 October 2019.

Schedule 4 – Additional Procedures

NOTIFICATION OF LANDOWNERS

Schedule 4 - Condition 1 (Notification of Exceedance)

Condition

As soon as practicable, and no longer than 7 days, after obtaining monitoring results showing:

- *an exceedance of any criteria in Schedule 3, the Proponent must notify the affected landowners in writing of the exceedance, and provide regular monitoring results, at least every 3 months, to each affected landowner until the project is again complying with the relevant criteria; and*
- *an exceedance of any air quality criteria in Schedule 3, the Proponent 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).*

Compliance Statement

In the 2019 exceedances occurred with respect to the following criteria in Schedule 3:

- Schedule 3 – Condition 10 (Air Quality)
  Dust exceedance at monitoring location D1 (on site, northwest of quarry pit) for monitoring period 26/08/2019 to 24/09/2019. Council is the owner and operator of the Quarry site. Compliance and operational areas were notified via email on 2 October 2019, which is sufficient for internal notification and record management purposes under Council's structure.

  Dust exceedance at monitoring location D1 (on site, northwest of quarry pit) for monitoring period 18/11/2019 – 16/12/2019. Council is the owner and operator of the Quarry site. Compliance and operational areas were notified via email on 7 January 2020, which is sufficient for internal notification and record management purposes under Council's structure.

- Schedule 3 - Condition 19 – Ground Water Monitoring Results
  Consistent with previous years, the monitoring results indicated regular exceedances to the applicable criteria due to the underlying geology of the locality. Given the nature of the exceedances, LCC determined that there were no landholders adversely impacted on these occasions. Accordingly, no notification occurred in 2019.

INDEPENDENT REVIEW

Schedule 4 – Condition 2 (Independent Review if Impacts)

Condition

If an owner of privately-owned land considers the project 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 project 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 Proponent 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 project is complying with the relevant criteria in Schedule 3; and*
- *if the project 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; and

(c) comply with any written requests made by the Secretary to implement any findings of the review.

Compliance Statement

No neighbours have requested an independent assessment of the impacts of the development on their land in 2019.

PROPERTY INSPECTIONS

Schedule 4 - Condition 3 (Baseline Dilapidation Reports)

Condition

Prior to 30 June 2010, the Proponent must advise all owners of privately-owned land within 2 kilometres of proposed blasting activities, and any other landowner nominated by the Secretary, that they are entitled to a property inspection to establish the baseline condition of the property.

Compliance Statement

All notifications and associated inspections required by this condition were completed prior to 2019.

Schedule 4 – Condition 4 (Property Investigations)

Condition

If the Proponent receives a written request for a property inspection from any such landowner, the Proponent must:

(a) commission a suitably qualified person, whose appointment has been approved by Secretary, to inspect and report on the condition of any building or structure on the land, and recommend measures to mitigate any potential blasting impacts; and

(b) give the landowner a copy of this property inspection report.

Note: It is preferable for the property inspection to be carried out prior to the commencement of blasting activities on the site, and the Proponent should facilitate this occurring wherever possible.

Compliance Statement

No landholder has requested an independent property investigation in 2019.

PROPERTY INVESTIGATIONS

Schedule 4 - Condition 5 (Property Investigations)

Condition

If any owner of privately-owned land within 2 kilometres of proposed blasting activities, or any other landowner nominated by the Secretary, claims that his/her property, including vibration-sensitive infrastructure such as water supply or underground irrigation mains, has been damaged as a result of blasting at the project, the Proponent shall within 3 months of receiving this request:

(a) commission a suitably qualified person whose appointment has been approved by the Secretary to investigate the claim and prepare a property investigation report; and

(b) give the landowner a copy of the report.

If this independent investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damage to the satisfaction of the Secretary.

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

Compliance Statement

No landholder has requested an independent property investigation in 2019.

Schedule 5 – Environmental Management, Reporting & Auditing

ENVIRONMENTAL MANAGEMENT STRATEGY

Schedule 5 - Condition 1 (Environmental Management Strategy)

Condition

The Proponent must prepare an Environmental Management Strategy for the project 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 Proponent;

(b) provide the strategic framework for environmental management of the project;

(c) identify the statutory approvals that apply to the project;

(d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;

(e) describe the procedures to be implemented to:

- *keep the local community and relevant agencies informed about the operation and*
- *environmental performance of the project;*
- *receive, record, handle and respond to complaints;*
- *resolve any disputes that may arise during the course of the project;*
- *respond to any non-compliance;*
- *respond to emergencies; and*

(f) include:

- *copies of any strategies, plans and programs approved under the conditions of this approval; and*
- *a clear plan depicting all the monitoring to be carried out under the conditions of this approval.*

The Proponent must implement any Environmental Management Strategy as approved from time to time by the Secretary.

Compliance Statement

The Environmental Management Strategy for the Quarry was updated and endorsed by DPE in 2018. A copy of the updated Plan is available on the LCC Website.

EVIDENCE OF CONSULTATION

Schedule 5 - Condition 2 (Consultation with Agencies)

Condition

Where consultation with any State or local agency is required by the conditions of this approval, the Proponent must:

(a) consult with the relevant agency prior to submitting the required document to the Secretary for approval;

(b) submit evidence of this consultation as part of the relevant document;

© describe how matters raised by the agency have been addressed and any matters not resolved; and

(d) include details of any outstanding issues raised by the agency and an explanation of disagreement between any agency and the Proponent.

Compliance Statement

The updated Environmental Management Strategy (refer Schedule 5 – Condition 1) includes a list of Consultation Agencies as required by various conditions of consent.

MANAGEMENT PLAN REQUIREMENTS

Schedule 5 - Condition 3 (Preparation of Management Plans)

Condition

The Proponent must ensure that the management plans required under this approval 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 project or any management measures;*

(c) a description of the measures that to be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;

(d) a program to monitor and report on the:
- *impacts and environmental performance of the project; and*
- *effectiveness of any management measures (see (c) above);*

(e) a contingency plan to manage any unpredicted impacts and their consequences 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 project over time;

(g) a protocol for managing and reporting any:
- *incidents;*
- *complaints;*
- *non-compliances with statutory requirements; and*
- *exceedances of the impact assessment criteria and/or performance criteria; and*

(h) a protocol for periodic review of the plan.

Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.

Compliance Statement

As outlined herein, various Management Plans have been prepared and submitted to the Department in recent years. This AEMR has not reviewed the processes to develop these documents or the content or adequacy thereof, as it is assumed that the DPE review will assess each plan in accordance with the applicable conditions of approval.

APPLICATION OF EXISTING MANAGEMENT PLANS

Schedule 5 - Condition 4 (Application of Management Plans)

Condition

The Proponent must continue to apply existing approved management plans, strategies or monitoring programs that have most recently been approved under this approval, until the approval of a similar plan, strategy or program under this approval.

Compliance Statement

Noted.

REVISION OF STRATEGIES, PLANS & PROGRAMS

Schedule 5 - Condition 4 (Review of Strategies and Plans)

Note: Condition numbering appears to be an error within the approval notice.

Condition

Within 3 months of the submission of an:

(a) incident report under condition 9 below;

(b) Annual Review under condition 11 below;

(c) audit report under condition 12 below; and

(d) any modifications to this approval,

the Proponent must review the strategies, plans and programs required under this approval, to the satisfaction of the Secretary. The proponent must notify the Department in writing of any such review being undertaken. Where this review leads to revisions in any such document, then within 6 weeks of the review the revised document must be submitted for the approval of the Secretary.

Note: The purpose of this condition is to ensure that strategies, plans and programs are regularly updated to incorporate any measures recommended to improve environmental performance of the project.

Compliance Statement

Council advises that they have systems and processes in place to:

> *"...review any incidents, non-conformities and/or recommendations for improvement against the approval conditions and management plans. Should a report require update or amendment, it is forwarded to the Department for approval. Planned activities are assessed against the approval conditions and EPL to determine if any modification is required."*

UPDATING AND STAGING OF STRATEGIES, PLANS OR PROGRAMS

Schedule 5 - Condition 5 (Update to Strategies and Plans)

Condition

To ensure that strategies, plans or programs required under this approval are updated on a regular basis, and that they incorporate any appropriate additional measures to improve the environmental performance of the project, the Proponent may at any time submit revised strategies, plans or programs for the approval of the Secretary. With the agreement of the Secretary, the Proponent may also submit any strategy, plan or program required by this approval on a staged basis. The Secretary may approve a revised strategy, plan or program required under this approval, or the staged submission of any of these documents, at any time. With the agreement of the Secretary, the Proponent may prepare the revised or staged strategy, plan or program without undertaking consultation with all parties nominated under the applicable condition in this approval. While any strategy, plan or program may be submitted on a staged basis, the proponent will need to ensure that the operations associated with the project 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 project 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.

Compliance Statement

Noted. As indicated elsewhere, a range of updates to the Management Plans and Strategies have been submitted to DPE for endorsement in recent times.

ADAPTIVE MANAGEMENT

Schedule 5 – Condition 6 (Notification of Exceedance)

Condition

The Proponent must assess and manage project-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 approval 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 Proponent must as soon as becoming aware of any exceedance:

(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);

(c) within 14 days of the exceedance occurring, submit a report to the Secretary describing these remediation options and any preferred remediation measures or other course of action; and

(d) implement remediation measures as directed by the Secretary; to the satisfaction of the Secretary.

Compliance Statement

Refer to the assessment against Schedule 3 - Condition 17.

COMMUNITY CONSULTATIVE COMMITTEE

Schedule 5 - Condition 7 (Community Consultative Committee)

Condition

The Proponent must establish and operate a Community Consultative Committee (CCC) for the project to the satisfaction of the Secretary. The CCC must be operated in general accordance with the Department's Community Consultative Committee Guidelines, November 2016 (or later version).

Notes:

- *The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Proponent complies with this approval.*
- *In accordance with the guidelines, the Committee should comprise an independent chair and appropriate representation from the Proponent, Council and the local community.*

Compliance Statement

As outlined in the 2018 AEMR the CCC decided to convene annually due to the lack of attendance. In keeping with this, the CCC met on one occasion in 2019 (November). The Minutes of this meeting are provided at **Attachment 12** and are also available on the LCC Website.

Schedule 5 - Condition 8 (Reporting of Incidents)

Condition

The Proponent must immediately notify the Secretary (using the contact name, email address and phone number provided by the Department from time to time) and any other relevant agencies of any incident.

Compliance Statement

Exceedances to the requirements of Schedule 3 have occurred on a number of occasions in 2019.

A description of these events is provided within the Compliance Statements relative to Schedule 3 – Condition 19 and Schedule 3 – Condition 19.

Table 4 summarises the timelines associated with the reporting of the event.

Table 4 – Notice of Exceedance

Exceedance	Date that LCC became aware of the exceedance / incident.	First Reported to DPE	Follow up reporting to DPE
Dust			
Monitoring Location D1 26.08.19 – 24.09.19	30 September 2019	2 October 2019	8 November 2019 and then 9 October 2019 DPIE reinforced via email dated 09.10.19 the importance of completing reporting in accordance with the timeframes required by the approval.
Monitoring Location D1 18.11.19 – 16.12.19	Friday 20th December (Late afternoon)	7 January 2020 Christmas shutdown 23 December – 6 January delayed reporting	14 January 2020
Groundwater			
March Quarter	2 April 2019	2 April 2019	Detailed report provided as part of initial notification
June Quarter	1 July 2019	-	See comment below.
September Quarter	19 September 2019	-	See comment below.
December Quarter	20 December 2019	-	See comment below.

As indicated in the comments against **Schedule 3 Condition 19,** the lack of reporting is in accordance with the framework of the updated and approved SWMP for the site which provide for the collation of site-specific background water quality parameters to determine appropriate trigger limits for the site.

Schedule 5 - Condition 9 (Reporting of Incidents)

Condition

Within 7 days of the date of the incident, the Proponent must provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested. This report must include the time and date of the incident, details of the incident, measures implemented to prevent re-occurrence and must identify any non-compliance with this approval.

Compliance Statement

Refer to comment against Schedule 5 - Condition 8.

REGULAR REPORTING

Schedule 5 - Condition 10 (Information to be Provided Online)

Condition

The Proponent must provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.

Compliance Statement

The information requirements as listed in Schedule 5 Condition 4 are available on the LCC website. **Attachment 13** provides a list of the documentation available as at 25 March 2020. As indicated, all required information was available on the website.

ANNUAL REVIEW

Schedule 5 - Condition 11 (Information to be Provided Online)

Condition

By the end of March each year, or other timing as may be agreed by the Secretary, the Proponent must submit a review to the Department reviewing the environmental performance of the project to the satisfaction of the Secretary. This review must:

(a) describe the project (including any progressive rehabilitation) that was carried out in the previous calendar year, and the project that is proposed to be carried out over the current calendar year;

(b) include a comprehensive review of the monitoring results and complaints records of the project over the previous calendar 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 approval;*
- *monitoring results of previous years; and*
- *relevant predictions in the documents listed in condition 2(a) of Schedule 2;*

(c) evaluate and report on:

- *the effectiveness of the air quality and noise management systems; and*
- *compliance with the performance measures, criteria and operating conditions in this approval.*

(d) identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance;

(e) identify any trends in the monitoring data over the life of the project;

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

(g) describe what measures will be implemented over the current calendar year to improve the environmental performance of the project.

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

Compliance Statement

The 2019 Annual Review will be submitted to DPE in March 2020 in accordance with the adopted timeframes. The 2019 Review has been structured to provide clear reporting against each Condition within the approval. Section 3 Part 3.1 provides a summary of key matters which have arisen in the preparation of the 2019 Annual Review and the actions proposed to resolve these issues.

INDEPENDENT ENVIRONMENTAL AUDIT

Schedule 5 - Condition 12 (3 Year Independent Audit)

Condition

Within three years of the date of grant of this project approval, and every 3 years thereafter, unless the Secretary directs otherwise, the Proponent must commission, commence and pay the full cost of an Independent Environmental Audit of the project. This audit must:

(a) be led and conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;

(b) include consultation with the relevant agencies and the CCC;

(c) assess the environmental performance of the project and whether it is complying with the relevant requirements in this approval and any relevant EPL or necessary water licences for the project (including any assessment, strategy, plan or program required under these approvals);

(d) review the adequacy of strategies, plans or programs required under the abovementioned approvals;

(e) recommend appropriate measures or actions to improve the environmental performance of the project, and/or any assessment, strategy, plan or program required under the abovementioned approvals; and

(f) be conducted and reported to the satisfaction of the Secretary.

Compliance Statement

The most recent Independent Environmental Audit was undertaken in December 2018 / January 2019 by GeoLINK. This document was finalised and issued to DPE on 14 February 2019. A copy of the 2019 Audit is available on the LCC Website.

Schedule 5 - Condition 13 (Implementation of Audit Recommendations)

Condition

Within 12 weeks of commencing this audit, or as otherwise agreed by the Secretary, the Proponent must submit a copy of the audit report to the Secretary and any other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of these recommendations as required. The Proponent must implement these recommendations, to the satisfaction of the Secretary.

Compliance Statement

The most recent Independent Environmental Audit was finalised and issued to DPE on 14 February 2019. **Table 5** summarises the identified 'non compliances' and 'areas for improvement' as contained within Section 4 of the Audit and provides information with respect to the proposed operational response to these matters:

Table 5

Identified Non-Compliances	
GeoLINK Comment	**LCC Response**
LCC include an action in the compliance tracking system to ensure that future reviews of the Biodiversity and Rehabilitation Bond are completed within the required timeframe.	*In 2018 (during the 3year audit review period) a designated compliance unit was established.*
Condition 30 states that reviews of the Biodiversity and Rehabilitation Bond need to be undertaken "within 3 months of each Independent Environmental Audit". We interpret this to mean within 3 months of the submission of the Independent Environmental Audit report to DPE. It is recommended that LCC check with DPE as to whether this is the correct interpretation.	*At the time, DPE confirmed that this task is to be completed within 3 months of audit report submission.*

LCC submit an application to modify the wording of Statement of Commitment 5.2 to allow compression braking in circumstances where it is appropriate for safety reasons.	*This matter forms part of the current modification application.*
LCC submit an application to modify the wording of Statement of Commitment 9.1 to allow the discharge of quarry water from the site via approved surface water discharge locations.	*This matter forms part of the current modification application.*
Identified Opportunities for Improvement	
GeoLINK Comment	**LCC Response**
Blast reports could be presented more clearly to assist with interpretation, checking and review. For example, a simple cover page could be included for each blast noting the date of the blast and the contractors involved. Supporting documentation could then be inserted after the cover page. Two of the non-compliances identified in this audit (3 & 4) relate to Statements of Commitments that have wording that is either inconsistent with the current management plans or quarry operations. A comprehensive review of the Statement of Commitments may reveal other inconsistencies or requirements that are redundant. All identified inconsistencies could be addressed in a single modification application.	*This recommended action has been requested of the operations manager and blast contractor*
To minimise the risk of future non-compliances with deadlines / timeframes, a comprehensive compliance tracking register could be developed, which includes all relevant conditions and requirements from the consent, management plans and the EPL.	*A Central Compliance calendar has been established in Microsoft Outlook which is accessible by Compliance staff and monitored daily.* *In addition, Site Checklists have been developed to capture information based on the requirements specified in the EPL, DA and Management Plans.*
The possibility of relocating the weather station to a more suitable location could be investigated, although it is noted that options may be restricted by electrical / IT infrastructure constraints. Refer to AS/NZS 3580.14:2014 Methods for sampling and analysis of ambient air – Part 14: Meteorological monitoring for ambient air quality	*Discussions with compliance and operational staff identified that the location of the weather station is suitable for monitoring of rainfall and wind conditions.*

monitoring applications for guidance.	
Annual quarry survey plans could be more clearly presented, including labels showing levels.	*The survey plan from June 2018 has been reviewed for improvement opportunities. It was identified that whilst the levels are shown on the plan, the scale could be larger. Council will review the next survey plan to ensure it is more clearly presented.*
The LCC Blakebrook Quarry webpage could be better organised with superseded documents either removed or placed into a superseded folder.	*A review of the LCC website on 25 March 20202 confirms that the applicable page is organised in a more 'user-friendly' fashion than previous years.*

ACCESS TO INFORMATION

Schedule 5 - Condition 14 (Information to be Available Online)

Condition

Within 3 months of the determination of Modification 1, until the completion of all works, including rehabilitation and remediation the Proponent 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 project;*
- *all approved strategies, plans and programs required under the conditions of this approval;*
- *a comprehensive summary of the monitoring results of the project, reported in accordance with the specifications in any conditions of this approval, or any approved plans and programs;*
- *a complaints register, updated monthly;*
- *the annual reviews of the project;*
- *any independent environmental audit as described in condition 12 above, and the Proponent'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.

Compliance Statement

Attachment 13 provides a schedule confirming that the information listed above is available on the LCC Website.

Attachment 14 provides a copy of the Complaint Register for 2019, with the register also available on the LCC website: The 2019 register, this has been updated on a monthly basis as required.

Appendix 5 – Noise Compliance Assessment

APPLICABLE METEOROLOGICAL CONDITIONS

Appendix 5 - Condition 1 (Weather Parameters)

Condition

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.

Compliance Statement

Noted

DETERMINATION OF METEOROLOGICAL CONDITIONS

Appendix 5 - Condition 2 (Meteorological Station)

Condition

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 13 of Schedule 3.

Compliance Statement

The meteorological station was installed onsite in early 2018. The 2019 Acoustic Assessment includes reference to the on-site weather data as well as available external meteorological data.

Appendix 5 - Condition 3 (Timing of Assessment)

Condition

A noise compliance assessment must be undertaken within two months of commencing mining operations under EA (Mod 1). The assessment must be conducted by a suitably qualified and experienced acoustical practitioner and must assess compliance with the noise criteria in Table 2. A report must be provided to the Secretary and EPA within 1 month of the assessment.

Compliance Statement

Mod 1 was approved in September 2017. The required noise compliance assessment was completed in November 2017 in accordance with this requirement.

Appendix 5 - Condition 4 (Methodology of Assessment)

Condition

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;

(c) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration; and

(d) the use of an appropriate modifying factor for low frequency noise to be applied during compliance testing at any individual residence if low frequency noise is present (in accordance with the INP) and before comparison with the specified noise levels in the approval

Compliance Statement

The 2019 Acoustic Assessment (**Attachment 7**) has been completed in accordance with the NSW Industrial Noise Policy.

Part 3 – Summary of Findings & Future Actions

3.1 Summary of Non-Compliances

The 2019 AEMR has identified the following non-compliances:

- Schedule 3 – Condition 10 (Air Quality) – Dust exceedance at monitoring location D1 for monitoring period 26/08/2019 to 24/09/2019. Council investigated this exceedance and identified that during the exposure period the water truck stationed at Blakebrook Quarry was unavailable for several days as it was being utilised to assist Fire and Rescue NSW during an emergency event to control a significant fire at the Lismore Waste Facility. The locality was also impacted by significant winds and smoke from the Lismore Waste Facility and other bushfires in proximity.
- Schedule 3 – Condition 10 (Air Quality) - Dust exceedance at monitoring location D1 for monitoring period 18/11/2019 – 16/12/2019. The dust limit is 4g/m2/month whilst on this occasion dust was reported as 8.6 g/m2/month. All other monitoring points did not exceed dust limits. This reading was connected to the extreme dry weather during the monitoring period as well as the presence of significant bushfire activity within the northern rivers
- Schedule 3 – Condition 19 (Groundwater) – On each occasion, the 2018 Groundwater Sampling Results exceeded a number of applicable parameters, with the results directly linked to the underlying geology of the locality. The March 2019 exceedance was reported to DPE as required pursuant to Schedule 5 Condition 6. However, the June, September and December results were not. The reason for this is was due to the agreed framework within the Soil and Water Management Plan

3.2 Status of Actions Identified in 2018 AEMR

The 2018 AEMR identified a number of actions and measures to improve environmental performance which were to be completed in 2018. The individual actions and advice with respect to progress on the completion of these tasks is provided below:

- **Action A:** A request has been made to amend various conditions of consent relating to the quarry. Once this amendment is finalised, a further update to the management plans will be required.

  Response: The modification is yet to be determined. As part of the modification application, LCC has requested a 6month timeframe be available for Council to update the Management Plans.

- **Action B:** Continue to advance the rezoning processes associated with the environmental offset areas. Timing to finalise this process will be dependent upon the LCC Sustainable Development Department and associated amendment schedule for the Lismore Local Environmental Plan.
  Response: The Planning Proposal is currently public consultation stage

- **Action C:** A request will be made to amend the EPA Licence for the site with respect to release points for surface water discharge. No change is required to DPE approvals to facilitate this outcome.
  Response: Surface water is managed as per the existing Soil and Water Management Plan. When Quarry operations expand and other sediment basins come on line, the EPL will be amended accordingly.

3.3 Major Activities Planned for 2020

The following actions have been identified by LCC as priority projects in 2020:

a) Continuation of groundwater data collection to establish 12 data points for each monitoring well;
b) Working with Council's Strategic Planners to finalise the Planning Proposal to rezone the environmental offset area to the E2 Environmental Conservation Zone; and
c) Continuing to work with DPE to finalise the current modification request to Part 3A Approval No.07_0020.

Part 4 - Conclusion

This Annual Environmental Monitoring Report (AEMR) has been prepared in response to Schedule 5 Condition 11 of the Blakebrook Quarry Part 3A Approval No. 07_0020 (Mod 1). It details actions taken during 2019, provides a snapshot of progress on compliance issues and elaborates on planned activities for the coming year.

Key findings of the AEMR are as follows:

- 2019 has been a year of consolidation and finalisation of key assessments and management plans.
- As per previous years, there has been a regular exceedance of environmental criteria relating to groundwater, due to the underlying soil conditions impacting on ground water results. The updated Soil and Water Management Plan incorporates a process to establish whether or not the current limits are suitable given the underlying geology of the site.
- There were two exceedances with respect to dust results. In both instances, the results appear to be directly linked to the very dry weather experienced during the sampling periods and the large number of significant fires in the locality.

Should you have any queries regarding the above, please do not hesitate to contact Karina Vikstrom of this office.

[redacted]

Town Planner. BTP CPP

[redacted]

Town Planner BTP

Date: 31 March 2020

Newton Denny Chapelle
SURVEYORS PLANNERS ENGINEERS

ATTACHMENT 1

Part 3A Approval No.07_0020 (Mod 1)

Notice of Modification

Section 75W of the *Environmental Planning and Assessment Act 1979*

As delegate of the Minister for Planning, I modify the project approval referred to in Schedule 1, as set out in Schedule 2.

[redacted]

[redacted]
Director Resource Assessments

Sydney 18th September 2017

SCHEDULE 1

The Project Approval (MP 07_0020) for the Blakebrook Quarry Project granted by the delegate for the Minister for Planning on 24 November 2009

SCHEDULE 2

1. Delete all words after Schedule 1 and replace with:

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*
Annual Review	The review required by condition 11 of Schedule 5.
AHD	Australian Height Datum
BCA	Building Code of Australia
Biodiversity Offset Strategy	The conservation and enhancement program as described in the EA (see also Table 5 and Appendix 4).
CCC	Community Consultative Committee
Council	Lismore City Council
Day	The period from 7am to 6pm on Monday to Saturday, and 8am to 6pm on Sundays and Public Holidays
OEH	Office of Environment and Heritage
Department	Department of Planning and Environment
DPI Water	Department of Primary Industries - Water
DRG	Division of Resources and Geoscience of the Department
EA	Environmental Assessment titled *Blakebrook Quarry Expansion, Environmental Assessment Report, Final Report*, January 2009, and the Proponent's response to submissions titled *Blakebrook Quarry Expansion, Response to Submissions, Final Report*, August 2009
EA (Mod 1)	Environmental Assessment titled *Blakebrook Quarry Modification Application August 2017*
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
Feasible	Feasible relates to engineering considerations and what is practical to build
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 approval
INP	*NSW Industrial Noise Policy* (NSW EPA, 2000)
Laden	Trucks transporting quarry products from the site and/or trucks transporting topsoil or mulch 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 approval, 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 approval
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 project
Negligible	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
POEO Act	*Protection of the Environment Operations Act 1997*
Privately-owned land	Land that is not owned by a public agency or the Proponent (or its subsidiary)
Project	The project as described in the documents listed in condition 2(a) of Schedule 2
Proponent	Lismore City Council, or its successors in title
Quarrying operations	The extraction, processing, stockpiling and transportation of extractive materials carried out on the site and the associated removal of vegetation, topsoil and overburden
Quarry products	Includes all saleable quarry products, but excludes tailings, other wastes and rehabilitation material
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.
RMS	Roads and Maritime Services
SEPP 44	*State Environmental Planning Policy No. 44 – Koala Habitat Protection*
Secretary	Secretary of the Department, or nominee
Site	The land referred to in Schedule 1

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 approval, the Proponent must implement all reasonable and feasible measures to prevent or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the project.

TERMS OF APPROVAL

2. The Proponent must carry out the project:
   (a) generally in accordance with the EA and EA (Mod 1); and
   (b) in accordance with the conditions of this approval, Project Layout Plan and the Statement of Commitments.

   Notes:
   - *The Project Layout Plan is shown in Appendix 1;*
   - *The Statement of Commitments is reproduced 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 approval shall prevail to the extent of any inconsistency.

4. The Proponent must comply with any written 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 approval (including any stages of these documents);
   (b) any reviews, reports or audits undertaken or commissioned by the Department regarding compliance with this approval;
   (c) and the implementation of any actions or measures contained in these documents.

5. By 30 June 2010, the Proponent shall surrender development consent DA 95/239 to the relevant consent authority to the satisfaction of the Secretary.

LIMITS ON APPROVAL

6. The Proponent may carry out quarrying operations on the site until 31 December 2039.

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

7. The Proponent must not undertake quarrying operations below 55 m AHD in the northern pit or 105 m AHD in the southern pit.

   Note: Drainage sumps may be constructed below this level with the agreement of the Secretary.

8. The Proponent must not:
   (a) transport more than 600,000 tonnes of quarry materials from the site per calendar year; or
   (b) dispatch more than 100 laden trucks from the site on any calendar day.

   Note: Dispatch of laden trucks is also controlled under condition 1 of Schedule 3.

STRUCTURAL ADEQUACY

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

   Notes:
   - *Under Part 4A of the EP&A Act, the Proponent is required to obtain construction and occupation certificates for any proposed building works;*
   - *Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.*

DEMOLITION

10. The Proponent 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

11. Unless the Proponent and the applicable authority agree otherwise the Proponent must:
    (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the project; and
    (b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the project.

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 13 of Schedule 2.

OPERATION OF PLANT AND EQUIPMENT

12. The Proponent must ensure that all the plant and equipment used at the site, or to monitor the performance of the project is:
    (a) maintained in a proper and efficient condition; and
    (b) operated in a proper and efficient manner.

SECTION 94 CONTRIBUTIONS

13. The Proponent must pay Council an annual financial contribution toward the maintenance of local roads used for haulage of quarry products. The contribution must be determined in accordance with the *Lismore City Council Section 94 Contribution Plan*, 2004, or any subsequent relevant contributions plan adopted by Council.

PRODUCTION DATA

14. The Proponent must:
    (a) from the commencement of quarrying operations provide calendar year annual quarry production data to DRG using the standard form for that purpose; and
    (b) include a copy of this data in the Annual Review.

COMPLIANCE

15. The Proponent must ensure that all employees, contractors and sub-contractors are aware of, and comply with, the conditions of this approval relevant to their respective activities.

IDENTIFICATION OF BOUNDARIES

16. The Proponent must ensure that the boundaries of the approved limits of extraction are clearly marked at all times in a permanent manner that allows operating staff and inspecting officers to clearly identify those limits.

SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS

NOISE

Hours of Operation

1. The Proponent must comply with the operating hours set out in Table 1.

Table 1: Operating hours

Activity	*Permissible Hours*
Quarrying operations including loading and dispatch of laden trucks	7 am to 6 pm Monday to Friday
	7 am to 3 pm Saturday
	At no time on Sundays or public holidays
Blasting	10 am to 3 pm Monday to Friday (except public holidays)
	At no time on Sundays or public holidays
Maintenance	May be conducted at any time, provided that these activities are not audible at any privately-owned residence

2. The following activities may be carried out outside the hours specified in condition 1 above:
   (a) delivery or dispatch of materials as requested by Police or other public authorities; and
   (b) emergency work to avoid the loss of lives, property or to prevent environmental harm.

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

3. The Proponent must ensure that the noise generated by the project does not exceed the criteria in Table 2 at any residence on privately-owned land.

Table 2: Noise criteria dB(A)

Receiver	*Day* $L_{Aeq\ (15\ minute)}$
Location 2	36
All other locations	35

Noise generated by the project is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the *NSW Industrial Noise Policy*. Appendix 5 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 2 do not apply if the Proponent has an agreement with the relevant landowner to exceed the noise criteria, and the Proponent has advised the Department in writing of the terms of this agreement.

Operating Conditions

4. The Proponent must:
   (a) implement best practice management to minimise the construction, operational and road transportation noise of the project;
   (b) minimise the noise impacts of the project during meteorological conditions when the noise criteria in this approval do not apply (see Appendix 5);
   (c) carry out noise monitoring (at least every 3 months or as otherwise agreed with the Secretary) to determine whether the project is complying with the relevant conditions of this approval; and
   (d) regularly assess noise monitoring data and modify and/or stop operations on site to ensure compliance with the relevant conditions of this approval,

   to the satisfaction of the Secretary.

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

Noise Management Plan

5. The Proponent must prepare a Noise Management Plan for the project to the satisfaction of the Secretary. This plan must:
   (a) be prepared in consultation with the EPA;

(b) be submitted to the Secretary within 3 months of the determination of Modification 1, unless otherwise agreed by the Secretary;
(c) describe the measures to be implemented to ensure:
- compliance with the noise criteria and operating conditions of this approval;
- best practice management is being employed; and
- the noise impacts of the project are minimised during meteorological conditions under which the noise criteria in this approval do not apply (see Appendix 5);

(d) describe the proposed noise management system; and
(e) include a monitoring program to be implemented to measure noise from the project against the noise criteria in Table 2.

The Proponent must implement the Noise Management Plan as approved from time to time by the Secretary.

BLASTING

Blasting Impact Assessment Criteria

6. The Proponent must ensure that blasting on site does not cause any exceedance of the criteria in Table 3.

Table 3: 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 Proponent has a written agreement with the relevant owner to exceed the limits in Table 3, and the Proponent has advised the Department in writing of the terms of this agreement.

Blasting Frequency

7. The Proponent may carry out a maximum of 2 blasts per month, 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

8. During blasting operations, the Proponent must:
(a) implement best practice management to:
- protect the safety of people and livestock;
- protect public or private infrastructure and property from damage; and
- minimise the dust and fume emissions;

(b) operate a suitable system to enable the local community to get up-to-date information on the proposed blasting schedule on site; and
(c) carry out regular monitoring to determine whether the project is complying with the relevant conditions of this approval,
to the satisfaction of the Secretary.

Blast Management Plan

9. The Proponent must prepare a Blast Management Plan for the project to the satisfaction of the Secretary. This plan must:
(a) be submitted to the Secretary for approval within 3 months of the determination of Modification 1, unless otherwise agreed by the Secretary;
(b) describe the measures to be implemented to ensure compliance with the blast criteria and operating conditions of this approval;
(c) include measures to manage flyrock to ensure the safety or people and livestock and to protect property;
(d) include a monitoring program for evaluating and reporting on compliance with the blasting criteria in this approval;
(e) include local community notification procedures for the blasting schedule, in particular to nearby residences; and

(f) include a protocol for investigating and responding to complaints related to blasting operations.

The Proponent must implement the Blast Management Plan as approved from time to time by the Secretary.

AIR QUALITY

Air Quality Impact Assessment Criteria

10. The Proponent must ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the project do not cause exceedances of the criteria in Table 4 at any residence on privately-owned land.

Table 4: Air quality criteria

Pollutant	***Averaging Period***	***Criterion***	
Particulate matter < 10 µm (PM_{10})	Annual	[a,d] 25 µg/m³	
Particulate matter < 10 µm (PM_{10})	24 hour	[b] 50 µg/m³	
Total suspended particulates (TSP)	Annual	[a,d] 90 µg/m³	
[c] Deposited dust	Annual	[b] 2 g/m²/month	[a,d] 4 g/m²/month

Notes to Table 4:
a Cumulative impact (ie increase in concentrations due to the project plus background concentrations due to all other sources).
[b] Incremental impact (ie increase in concentrations due to the project alone, with zero allowable exceedances of the criteria over the life of the project.
[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 11, 12 and 13 to develop and implement an air quality management system that ensures operational responses to the risks of exceedance of the criteria.

Operating Conditions

11. The Proponent must:
(a) implement best practice management to minimise the dust emissions of the project;
(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 approval;
(c) minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events (see note d under Table 4);
(d) monitor and report on compliance with the relevant air quality conditions in this approval; 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

12. The Proponent must prepare an Air Quality Management Plan for the project to the satisfaction of the Secretary. This plan must:
(a) be submitted to the Secretary for approval within 3 months of the determination of Modification 1, unless otherwise agreed by the Secretary;
(b) describe the measures to be implemented to ensure:
- compliance with the air quality criteria and operating conditions of this approval;
- best practice management is being employed; and
- the air quality impacts of the project are minimised during adverse meteorological conditions and extraordinary events;

(c) describe the proposed air quality management system;
(d) include an air quality monitoring program that:
- is capable of evaluating the performance of the project;
- includes a protocol for determining any exceedances of the relevant conditions of approval; and
- effectively supports the air quality management system.

The Proponent must implement the approved Air Quality Management Plan as approved from time to time by the Secretary.

Meteorological Monitoring

13. For the life of the project, the Proponent 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 and Analysis of Air Pollutants in New South Wales* guideline.

Greenhouse Gas Emissions

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

SOIL AND WATER

Water Supply

15. The Proponent must ensure that it has sufficient water for all stages of the project, and if necessary, adjust the scale of operations under the approval to match its available water supply, to the satisfaction of the Secretary.

Water Discharges

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

Groundwater Assessment

17. The Proponent must undertake a detailed groundwater assessment to the satisfaction of the Secretary. This assessment must be:
    (a) prepared by a suitably qualified expert in consultation with DPI Water;
    (b) submitted to the Secretary for approval by 30 December 2018;
    (c) approved by the Secretary before any extraction below 105 m AHD in the northern pit or below 118.5 m AHD in the southern pit;
    (d) adequately assess groundwater resources affected by the northern and southern pits, to the proposed full extraction depths of those pits;
    (e) adequately assess all groundwater impacts associated with proposed extraction;
    (f) provide data for predicted groundwater pit inflows during and following extraction; and
    (g) propose management measures to address pit inflows and impacts to groundwater resources.

    The Proponent must implement the management measures proposed in the groundwater assessment to the satisfaction of the Secretary.

Soil and Water Management

18. If groundwater is encountered during quarrying operations in the South Pit under EA (Mod 1), the Proponent must cease quarrying operations until authorised to recommence by the Secretary.

19. The Proponent must prepare a Soil and Water Management Plan for the project to the satisfaction of the Secretary. This plan must:
    (a) be prepared by suitably qualified and experienced person/s approved by the Secretary;
    (b) be prepared in consultation with the EPA and DPI Water;
    (c) be submitted to the Secretary for approval within 3 months of the determination of Modification 1, unless otherwise agreed by the Secretary; and
    (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 to be implemented to minimise clean water use on site;
        (ii) Surface Water Management Plan, that includes:
            - a program for obtaining detailed baseline data on surface water flows and quality in water bodies that could potentially be affected by the project;
            - a detailed description of the surface water management system on site including the:
                - clean water diversion system;
                - erosion and sediment controls;
                - dirty water management system; and

- water storages; and
- a program to monitor and report on:
  - any surface water discharges;
  - the effectiveness of the water management system,
  - the quality of water discharged from the site to the environment;
  - surface water flows and quality in local watercourses;

(iii) Groundwater Management Plan that includes:

- a provision that requires the Proponent to obtain appropriate water licence(s) to cover the volume of any unforeseen groundwater inflows into the quarry from the quarry face or floor; and
- a monitoring program to manage potential impacts, if any, on any alluvium and associated surface water source near the proposed extraction area that includes:
  - identification of a methodology for determining threshold water level criteria;
  - contingency measures in the event of a breach of thresholds; and
  - a program to regularly report on monitoring.

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

TRANSPORT

Monitoring of Product Transport

20. The Proponent must keep accurate records of all laden truck movements to and from the site (including time of arrival and dispatch) and publish a summary of records on its website every 6 months.

Road Upgrades

21. The Proponent must undertake the following road upgrade works generally in accordance with the recommendations in the EA, and to the satisfaction of the RMS:
    (a) upgrade the intersection of the Quarry Access and Nimbin Road to a 'Type AUR Intersection Treatment', prior to 31 December 2010;
    (b) upgrade the guard rails on the approaches to Booerie Creek Bridge prior to 31 December 2010;
    (c) upgrade the Booerie Creek Road and Nimbin Road intersection to a 'Type BAR Right Turn Treatment on the Through Road' prior to 31 December 2010;
    (d) upgrade the Wilson Street and Nimbin Road intersection to a 'Type CHR Right Turn Bay Treatment' prior to 31 December 2010; and
    (e) re-align Nimbin Road and the Quarry Access intersection to meet the AUSTROADS sight distance requirements for vehicles travelling in both directions through the intersection prior to 31 December 2011.

Note: The road works must be constructed in accordance with the relevant RMS or AUSTROADS standards, and signposted and lit in accordance with AS:1742 – Manual of Uniform Traffic Control Devices and AS/NZ 1158:2005 – Lighting for Roads and Public Spaces.

Operating Conditions

22. The Proponent must:
    (a) restrict truck movements from the quarry to an average of 50 laden trucks a day until all road upgrades works required by condition 20 of Schedule 3, are met or unless otherwise approved by the Secretary;
    (b) 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;
    (c) ensure that all laden trucks exiting the site are cleaned of material that may fall from vehicles, before leaving the site; and
    (d) use its best endeavours to ensure that appropriate signage is displayed on all trucks used to transport product from the project so they can be easily identified by road users.

Traffic Management Plan

23. The Proponent must prepare a Traffic Management Plan for the project 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 3 months of the determination of Modification 1, unless otherwise agreed by the Secretary;
    (c) describe the processes in place for the control of truck movements entering and exiting the site;
    (d) include a Drivers' Code of Conduct that details the safe and quiet driving practices that must be used by drivers transporting products to and from the quarry;

(e) describe the measures to be put in place to ensure compliance with the Drivers' Code of Conduct; and
(f) propose measures to minimise the transmission of dust and tracking of material onto the surface of the public road from vehicles leaving the quarry.

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

ABORIGINAL HERITAGE

Aboriginal Heritage Management Plan

24. The Proponent must prepare an Aboriginal Heritage Management Plan for the project 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 3 months of the determination of Modification 1, unless otherwise agreed by the Secretary; and
(d) include a description of the measures that would be implemented to:
- protect, monitor and manage known sites of archaeological significance;
- manage any new Aboriginal objects or relics that are discovered;
- store Aboriginal heritage items salvaged on site; and
- ensure ongoing consultation and involvement of the Registered Aboriginal Parties in the conservation and management of Aboriginal cultural heritage on the site.

The Proponent must implement the approved Aboriginal Heritage Management Plan as approved from time to time by the Secretary.

25. If any item or object of Aboriginal heritage significance is identified on site, the Proponent must ensure that:
(a) all work in the immediate vicinity of the suspected Aboriginal item or object ceases immediately;
(b) a 10 m buffer area around the suspected item or object is cordoned off; and
(c) the OEH is contacted immediately.

Work in the immediate vicinity of the Aboriginal item or object may only recommence in accordance with the provisions of Part 6 of the *National Parks and Wildlife Act 1974*.

BIODIVERSITY AND REHABILITATION

Biodiversity Offset Strategy

5. The Proponent must:
(a) implement the Biodiversity Offset Strategy (see Table 5);
(b) ensure that adequate resources are dedicated towards the implementation of this strategy;
(c) provide appropriate long term security for the offset area; and
(d) provide a timetable for the implementation of the offset strategy prior to 30 June 2010, or as otherwise agreed by the Secretary,
to the satisfaction of the Secretary.

Table 5: Biodiversity Offset Strategy

Offset Areas	***Minimum Size***
On-site offset (Protection Zone in Appendix 4)	17.6 hectares
Off-site offset (within Lismore local government area, and not already within a conservation area)	45 hectares
Total	62.6 hectares

Note: Mechanisms to provide appropriate long-term security to the land within the Biodiversity Offset Strategy in accordance with the NSW Biodiversity Offset Policy for Major Projects 2014, include a BioBanking Agreement, Voluntary Conservation Agreement or an alternative mechanism that provides for a similar conservation outcome.

Rehabilitation Objectives

26. The Proponent 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 6.

Table 6: Rehabilitation Objectives

Feature	Objective
All areas of the site affected by the project	• Safe • Hydraulically and geotechnically stable • Non-polluting • Fit for the intended post-mining land use(s) • Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and minimising visual impacts when viewed from surrounding land
Surface Infrastructure	• Decommissioned and removed, unless otherwise agreed by the Secretary
Quarry benches and pit floor	• 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

27. The Proponent 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 future re-disturbance.

Biodiversity and Rehabilitation Management Plan

28. The Proponent must prepare a Biodiversity and Rehabilitation Management Plan for the project to the satisfaction of the Secretary. This plan must:
    (a) be prepared by a suitably qualified expert;
    (b) be prepared in consultation with OEH and Council;
    (c) be submitted to the Secretary for approval within 3 months of the determination of Modification 1, unless otherwise agreed by the Secretary;
    (d) provide details of the conceptual final landform and associated land uses for the site;
    (e) describe how the implementation of the Biodiversity Offset Strategy will be integrated with the overall rehabilitation of the site;
    (f) include a Koala Management Plan prepared in accordance with SEPP 44;
    (g) include detailed performance and completion criteria for evaluating the performance of the Biodiversity Offset Strategy and rehabilitation of the site (including progressive rehabilitation), including triggers for any necessary remedial action;
    (h) describe the short, medium and long term measures to be implemented to:
        - manage remnant vegetation and habitat on site, including within the Biodiversity Offset Strategy area; and
        - ensure compliance with the rehabilitation objectives and progressive rehabilitation obligations in this approval;
    (i) include a detailed description of the measures described in paragraph (h) to 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, including core Koala habitat;
        - 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;

(j) include a program to monitor and report on the effectiveness of these measures, and progress against the performance and completion criteria;
(k) identify the potential risks to the successful implementation of the Biodiversity Offset Strategy, and include a description of the contingency measures to be implemented to mitigate these risks; and
(l) include details of who is responsible for monitoring, reviewing, and implementing the plan.

The Proponent must implement the Biodiversity and Rehabilitation Management Plan as approved from time to time by the Secretary.

Biodiversity and Rehabilitation Bond

29. Within 6 months of the approval of the Biodiversity and Rehabilitation Management Plan, the Proponent 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 approval. The sum of the bond must be determined by:
(a) calculating the full cost of implementing the Biodiversity Offset Strategy;
(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,
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.*

30. Within 3 months of each Independent Environmental Audit (see condition 12 of Schedule 5), the Proponent 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 project); and
(c) performance of the implementation of the Biodiversity Offset Strategy and rehabilitation of the site to date.

VISUAL

31. The Proponent must implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the project to the satisfaction of the Secretary.

WASTE

32. The Proponent 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 project;
(c) ensure that the waste generated by the project 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.

33. Except as expressly permitted in an EPL, the Proponent must not receive waste at the site for storage, treatment, processing, reprocessing or disposal.

LIQUID STORAGE

34. The Proponent 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

35. The Proponent 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

36. The Proponent must:
    (a) ensure that the project is suitably equipped to respond to any fires on site; and
    (b) assist the Rural Fire Service and emergency services to the extent practicable if there is a fire in the vicinity of the site.

SCHEDULE 4
ADDITIONAL PROCEDURES

NOTIFICATION OF LANDOWNERS

1. As soon as practicable, and no longer than 7 days, after obtaining monitoring results showing:
   (a) an exceedance of any criteria in Schedule 3, the Proponent must notify the affected landowners in writing of the exceedance, and provide regular monitoring results, at least every 3 months, to each affected landowner until the project is again complying with the relevant criteria; and
   (b) an exceedance of any air quality criteria in Schedule 3, the Proponent 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

2. If an owner of privately-owned land considers the project 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 project 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 Proponent 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 project is complying with the relevant criteria in Schedule 3; and
      - if the project 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; and
   (c) comply with any written requests made by the Secretary to implement any findings of the review.

PROPERTY INSPECTIONS

3. Prior to 30 June 2010, the Proponent must advise all owners of privately-owned land within 2 kilometres of proposed blasting activities, and any other landowner nominated by the Secretary, that they are entitled to a property inspection to establish the baseline condition of the property.

4. If the Proponent receives a written request for a property inspection from any such landowner, the Proponent must:
   (a) commission a suitably qualified person, whose appointment has been approved by Secretary, to inspect and report on the condition of any building or structure on the land, and recommend measures to mitigate any potential blasting impacts; and
   (b) give the landowner a copy of this property inspection report.

   Note: It is preferable for the property inspection to be carried out prior to the commencement of blasting activities on the site, and the Proponent should facilitate this occurring wherever possible.

PROPERTY INVESTIGATIONS

5. If any owner of privately-owned land within 2 kilometres of proposed blasting activities, or any other landowner nominated by the Secretary, claims that his/her property, including vibration-sensitive infrastructure such as water supply or underground irrigation mains, has been damaged as a result of blasting at the project, the Proponent shall within 3 months of receiving this request:
   (a) commission a suitably qualified person whose appointment has been approved by the Secretary to investigate the claim and prepare a property investigation report; and
   (b) give the landowner a copy of the report.

   If this independent investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damage to the satisfaction of the Secretary.

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

SCHEDULE 5
ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

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

   The Proponent must implement any Environmental Management Strategy as approved from time to time by the Secretary.

Evidence of Consultation

2. Where consultation with any State or local agency is required by the conditions of this approval, the Proponent must:
   (a) consult with the relevant agency prior to submitting the required document to the Secretary for approval;
   (b) submit evidence of this consultation as part of the relevant document;
   (c) describe how matters raised by the agency have been addressed and any matters not resolved; and
   (d) include details of any outstanding issues raised by the agency and an explanation of disagreement between any agency and the Proponent.

Management Plan Requirements

3. The Proponent must ensure that the management plans required under this approval 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 project or any management measures;
   (c) a description of the measures that to be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
   (d) a program to monitor and report on the:
      - impacts and environmental performance of the project; and
      - effectiveness of any management measures (see (c) above);
   (e) a contingency plan to manage any unpredicted impacts and their consequences 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 project over time;
   (g) a protocol for managing and reporting any:
      - incidents;
      - complaints;
      - non-compliances with statutory requirements; and
      - exceedances of the impact assessment criteria and/or performance criteria; and

(h) a protocol for periodic review of the plan.

Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.

Application of Existing Management Plans

4. The Proponent must continue to apply existing approved management plans, strategies or monitoring programs that have most recently been approved under this approval, until the approval of a similar plan, strategy or program under this approval.

Revision of Strategies, Plans & Programs

4. Within 3 months of the submission of an:
   (a) incident report under condition 9 below;
   (b) Annual Review under condition 11 below;
   (c) audit report under condition 12 below; and
   (d) any modifications to this approval,

   the Proponent must review the strategies, plans and programs required under this approval, to the satisfaction of the Secretary. The proponent must notify the Department in writing of any such review being undertaken. Where this review leads to revisions in any such document, then within 6 weeks of the review the revised document must be submitted for the approval of the Secretary.

   Note: The purpose of this condition is to ensure that strategies, plans and programs are regularly updated to incorporate any measures recommended to improve environmental performance of the project.

Updating and Staging of Strategies, Plans or Programs

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

   The Secretary may approve a revised strategy, plan or program required under this approval, or the staged submission of any of these documents, at any time. With the agreement of the Secretary, the Proponent may prepare the revised or staged strategy, plan or program without undertaking consultation with all parties nominated under the applicable condition in this approval.

   While any strategy, plan or program may be submitted on a staged basis, the proponent will need to ensure that the operations associated with the project 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 project 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 Proponent must assess and manage project-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 approval 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 Proponent must as soon as becoming aware of any exceedance:
   (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);
   (c) within 14 days of the exceedance occurring, submit a report to the Secretary describing these remediation options and any preferred remediation measures or other course of action; and
   (d) implement remediation measures as directed by the Secretary;

   to the satisfaction of the Secretary.

COMMUNITY CONSULTATIVE COMMITTEE

7. The Proponent must establish and operate a Community Consultative Committee (CCC) for the project to the satisfaction of the Secretary. The CCC must be operated in general accordance with the Department's *Community Consultative Committee Guidelines, November 2016* (or later version).

Notes:

- *The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Proponent complies with this approval.*
- *In accordance with the guidelines, the Committee should comprise an independent chair and appropriate representation from the Proponent, Council and the local community.*

REPORTING

Incident Reporting

8. The Proponent must immediately notify the Secretary (using the contact name, email address and phone number provided by the Department from time to time) and any other relevant agencies of any incident.

9. Within 7 days of the date of the incident, the Proponent must provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested. This report must include the time and date of the incident, details of the incident, measures implemented to prevent re-occurrence and must identify any non-compliance with this approval.

Regular Reporting

10. The Proponent must provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.

Annual Review

11. By the end of March each year, or other timing as may be agreed by the Secretary, the Proponent must submit a review to the Department reviewing the environmental performance of the project to the satisfaction of the Secretary. This review must:
    (a) describe the project (including any progressive rehabilitation) that was carried out in the previous calendar year, and the project that is proposed to be carried out over the current calendar year;
    (b) include a comprehensive review of the monitoring results and complaints records of the project over the previous calendar 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 approval;
        - monitoring results of previous years; and
        - relevant predictions in the documents listed in condition 2(a) of Schedule 2;
    (c) evaluate and report on:
        - the effectiveness of the air quality and noise management systems; and
        - compliance with the performance measures, criteria and operating conditions in this approval.
    (d) identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance;
    (e) identify any trends in the monitoring data over the life of the project;
    (f) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies;
    (g) escribe what measures will be implemented over the current calendar year to improve the environmental performance of the project.

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

INDEPENDENT ENVIRONMENTAL AUDIT

12. Within three years of the date of grant of this project approval, and every 3 years thereafter, unless the Secretary directs otherwise, the Proponent must commission, commence and pay the full cost of an Independent Environmental Audit of the project. This audit must:
    (a) be led and conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;
    (b) include consultation with the relevant agencies and the CCC;
    (c) assess the environmental performance of the project and whether it is complying with the relevant requirements in this approval and any relevant EPL or necessary water licences for the project (including any assessment, strategy, plan or program required under these approvals);
    (d) review the adequacy of strategies, plans or programs required under the abovementioned approvals;

(e) recommend appropriate measures or actions to improve the environmental performance of the project, and/or any assessment, strategy, plan or program required under the abovementioned approvals; and
(f) be conducted and reported to the satisfaction of the Secretary.

13. Within 12 weeks of commencing this audit, or as otherwise agreed by the Secretary, the Proponent must submit a copy of the audit report to the Secretary and any other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of these recommendations as required. The Proponent must implement these recommendations, to the satisfaction of the Secretary.

ACCESS TO INFORMATION

14. Within 3 months of the determination of Modification 1, until the completion of all works, including rehabilitation and remediation the Proponent 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 project;
- all approved strategies, plans and programs required under the conditions of this approval;
- a comprehensive summary of the monitoring results of the project, reported in accordance with the specifications in any conditions of this approval, or any approved plans and programs;
- a complaints register, updated monthly;
- the annual reviews of the project;
- any independent environmental audit as described in condition 12 above, and the Proponent'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
PROJECT LAYOUT PLAN

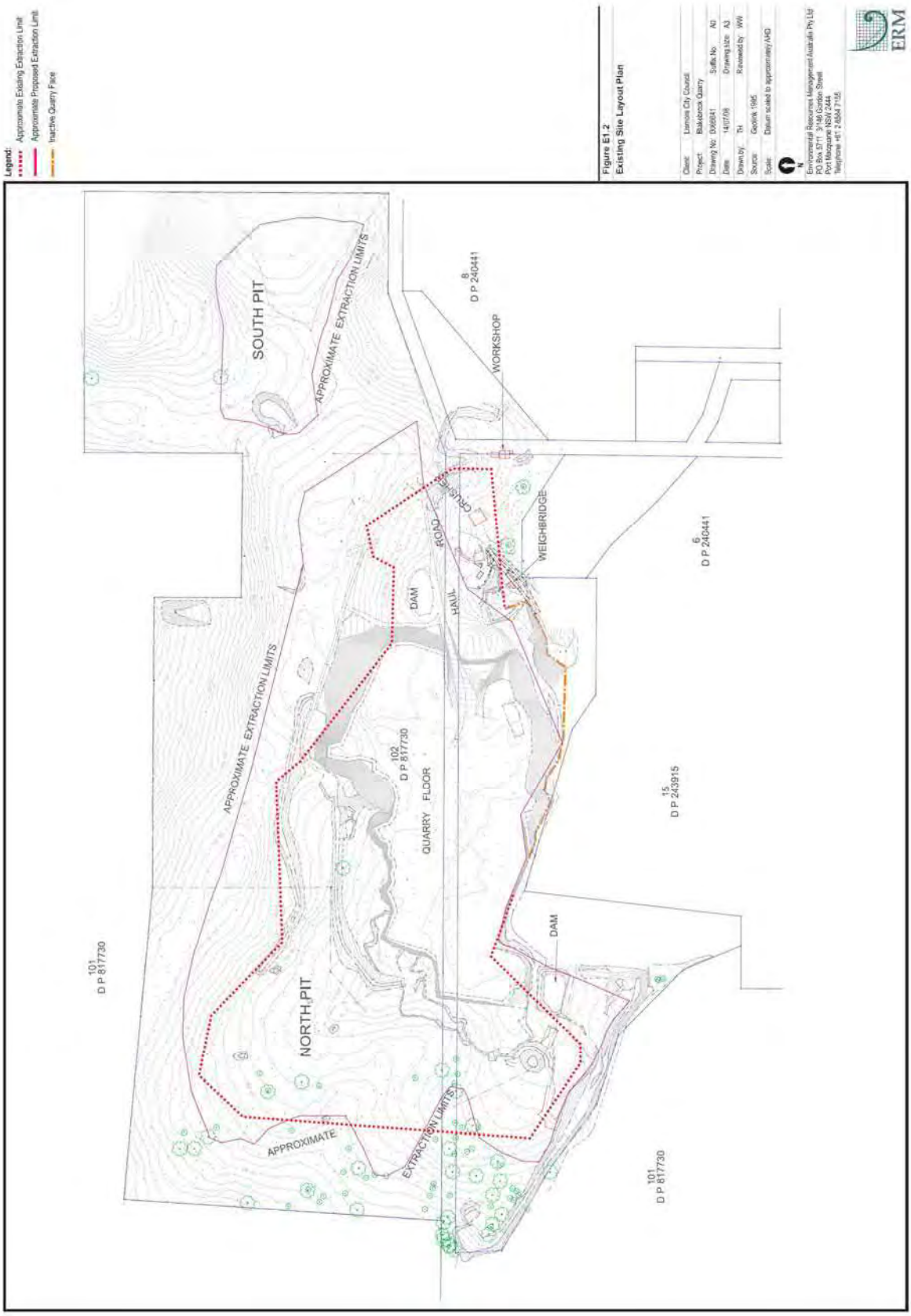


Table 3.1 Statement of Commitments

Item Number	Item	Commitment	Responsibility	Timing
1	Scope of Development			
1.1		The development will be carried out as outlined in the documentation and plans listed below, except where amended by other items of this Statement of Commitments. • Environmental Assessment (EA), prepared by ERM, 2009 and supporting reports; and • Quarry Plans (refer *Figures 2.3 to 2.5* of the EA (ERM, 2009).	Lismore City Council and/or its successors	Ongoing
2	Roads			
2.1		The proponent shall provide the following roadworks with associated stormwater drainage structures that have been designed and constructed in accordance with Council's Development, Design and Construction Manual (as amended). The proponent shall be responsible for any costs, including maintenance, for a period of six months from the date of approval of completion of the work. Required roadworks include:	Lismore City Council	Prior to the operation of the expanded quarry.
2.1.1		Construction of a type CHR intersection layout at the junction of the quarry access and Nimbin Road in accordance with AUSTROADS Pt 5 "Intersections at Grade" giving particular attention to sight distance. The access road will remain sealed from at least 50m back from Nimbin Road to prevent fouling of the road surface, as per existing conditions.	Lismore City Council	Prior to the operation of the expanded quarry.
2.1.2		Construction of a type CHR intersection layout at the junction of Nimbin Road and Wilson Street in accordance with AUSTROADS Pt 5 "Intersections at Grade".	Lismore City Council	Prior to the operation of the expanded quarry.

Item Number	Item	Commitment	Responsibility	Timing
2.1.3		Construction of a 1m wide gravel shoulder and repair existing pavement of Nimbin Road for a length of 200 metres at a location 2.8 kilometres north of the intersection of Nimbin Road and Wilson Street as recommended within Appendix G, Traffic Impact Study, of the Environmental Assessment.	Lismore City Council	Prior to the operation of the expanded quarry.
2.1.4		Installation of guard rail in accordance with the relevant standard at Booerie Creek Bridge approaches as recommended within Appendix G, Traffic Impact Study, of the Environmental Assessment.	Lismore City Council	Prior to the operation of the expanded quarry.
2.1.5		Works identified in Tables 1 and 2 of Appendix G, Traffic Impact Study, of the Environmental Assessment that have not been individually detailed within conditions of consents.	Lismore City Council	Prior to the operation of the expanded quarry.
Prior to the operation of the expanded quarry the applicant shall obtain a certificate of completion for the above works from Council. Prior to obtaining this certificate a practicing qualified surveyor or engineer shall submit to Council for approval, a "works-as-executed" set of plans, completed asset record forms and construction certification. The certification shall certify that all roads, drainage and civil works required by this development consent and the approved design plans have been completed in accordance with Council's Development and Construction Manual (as amended).				
2.2		The proponent shall provide the following roadworks with associated stormwater drainage structures that have been designed and constructed in accordance with Council's Development, Design and Construction Manual (as amended). The proponent shall be responsible for any costs, including maintenance, for a period of six months from the date of approval of completion of the work. Required roadworks include:		
2.2.1		Construction of a type BAR intersection layout at the junction of Nimbin Road and Booerie Creek Road in accordance with AUSTROADS Pt 5 "Intersections at Grade".	Lismore City Council	Once production rates reach 350,000 tonnes/ annum.
Prior to exceeding an annual extraction rate of 350,000 tonnes in any one year the applicant shall obtain a certificate of completion for the above works from Council. Prior to obtaining this certificate a practicing qualified surveyor or engineer shall submit to Council for approval, a "works-as-executed" set of plans, completed asset record forms and construction certification. The certification shall certify that all roads, drainage and civil works required by this development consent and the approved design plans have been completed in accordance with Council's Development and Construction Manual (as amended).				

Item Number	Item	Commitment	Responsibility	Timing
2.3		Prior to the operation of the expanded quarry a review of the Road Safety Audit contained within Tables 1 and 2 of Appendix G, Traffic Impact Study, of the Environmental Assessment shall be undertaken. All required works identified within the review that are not individually detailed within conditions of consents shall be completed prior to operation of the expanded quarry.	Lismore City Council	Prior to the operation of the expanded quarry.
2.4		Prior to the operation of the expanded quarry hinged "Truck Entering" warning signage, W5-22 signs, shall be erected at suitable locations, approximately 200 metres either side of the access, upon Nimbin Road advising of the traffic hazard. Signs shall be displayed during hours of haulage operations only.	Lismore City Council	Prior to the operation of the expanded quarry.
2.5		**Prior to the commencement of works required by the above conditions** the applicant shall obtain approval under section 138 of the Roads Act for the works upon the public road. For this approval full design plans of the proposed engineering works required upon the public road shall be submitted to and approved by Council. Plans shall include details of works required to satisfy condition(s) RD1. Such plans shall be accompanied with the fee, as adopted at the time of the relevant payment as indicated in Councils Fees and Charges.	Lismore City Council	Prior to the commencement of works required by the above conditions.
2.6		**Prior to the issue of the section 138 approval for works upon the public road** the proponent shall have approved by Council a plan of management for the construction of all civil works outside the real property boundaries of the proposed development. The plan shall table scheduling of works so as to be completed in the shortest possible time with minimal impact on the general community. Such plan shall include a Traffic Control Plan prepared by an RTA accredited person. All works shall comply with the Occupational Health and Safety Act.	Lismore City Council	Prior to the issue of the section 138 approval for works upon the public road.
2.7		The plan of management for the operation of the quarry shall incorporate a code of practice for trucking operations associated with the development. This code shall include a requirement for the use of CB radios for communication with buses and garbage trucks within all haulage vehicles as recommended within Appendix G, Traffic Impact Study, of the Environmental Assessment.	Lismore City Council	Prior to the issue of the section 138 approval for works upon the public road.

Item Number	Item	Commitment	Responsibility	Timing
2.8		The development shall provide adequate on site parking for all vehicles, plant and equipment associated with the development.	Lismore City Council	Prior to the operation of the expanded quarry.
2.9		The proposed access shall be sealed for the first 50 metre length from Nimbin Road. Driveways, access aisles and parking areas shall be provided with a suitable pavement, constructed and maintained in accordance with Council's Development, Design and Construction Manual (as amended).	Lismore City Council	Prior to the operation of the expanded quarry.
2.10		All loading and unloading shall take place within the property boundaries, as will the parking of construction and private vehicles associated with the development.	Lismore City Council	Ongoing.
2.11		Vehicles using any off street loading/unloading and/or parking area must enter and leave in a forward direction in accordance with Councils Development Control Plan No.1, Part A, Chapter 7 – Off Street Parking Requirements. All driveways and turning areas shall be kept clear of obstructions that prevent compliance with this condition.	Lismore City Council	Ongoing.
2.12		The proponent shall provide Council, on or before January 31, April 30, July 31 and October 31 in each year, with extraction figures detailing quantities of all material removed from the site for the previous quarter of operations.	Lismore City Council	Ongoing.
2.13		Annual payment of contributions levied under Section 94 of the Environmental Planning and Assessment Act and Lismore City Council S94 Contributions Plan 2004 (as amended) are required. Such levies shall contribute towards the provision of public services and/or amenities identified. Such levies shall be calculated utilising extraction returns as required by the above **condition**. The rates and amounts applying at the date of this notice for the approved extraction rate of 600,000 tonnes, totalling **$560,628** annually, have been calculated as set out below for your information. Levies set out below shall be increased in accordance with the percentage increase as notified by the Consumer Price Index (Sydney) annually. Levies shall be paid within 30 days of the Council issuing an assessment for the preceding year.	Lismore City Council	Ongoing

Item Number	Item	Commitment	Responsibility	Timing
		The contributions set out in the schedule are exclusive of any GST (if any) and where the provision of any services or the construction of any infrastructure or any other thing with those contributions occurs, then in addition to the amount specified above the Applicant will pay to the Council the GST (as defined below) which is payable by the Council in respect of the provision of such services or the construction of any infrastructure or any other thing. GST means any tax levy charge or impost under the authority of any GST law (as defined by the GST Act) and includes GST within the meaning of the GST Act. The GST Act means A New Tax System (Goods and Services Tax) Act 1999 or any amending or succeeding legislation. The levy shall be calculated in accordance with Councils adopted section 94 plan as at this date and be based on the following information: • Road construction cost of $369,000 per kilometre indexed for CPI annually from December 2003) • Average haulage distance of 15 kilometres • For use in calculations a conversion factor of 1.7 from m^3 to tonnes has been adopted • The first 5,000m^3 (8,500 tonnes) per annum shall be exempt from levies. Levy calculation for yearly extraction will be: ($369,000/6.74x10^6) x 15km x (Annual tonnage extracted – 8,500) x 1.025 x CPI = (369,000/6.74x10^6) x 15km x (600,000 – 8,500) x 1.025 x 1.126 = $560,628		

Item Number	Item	Commitment	Responsibility	Timing
2.14		A Traffic Noise Management Strategy (TNMS) be developed by the proponent to ensure that feasible and reasonable noise management strategies for vehicle movements associated with the facility are identified and applied, that include but are not necessarily limited to the following:	Lismore City Council	Prior to the operation of the expanded quarry.
2.14.1		Driver training to ensure that noisy practices such as the use of compression engine brakes are not unnecessarily used near sensitive receivers;		
2.14.2		Best noise practice in the selection and maintenance of vehicle fleets;		
2.14.3		Movement scheduling where practicable to reduce impacts during sensitive times of the day;		
2.14.4		Communication and management strategies for non licensee/proponent owned and operated vehicles to ensure the provision of the TNMS are implemented;		
2.14.5		A system of audited management practices that identifies non conformances, initiates and monitors corrective and preventative action (including disciplinary action for breaches of noise minimisation procedures) and assesses the implementation and improvement of the TNMS;		
2.14.6		Specific procedures to minimise impacts to identified sensitive receivers;		
2.14.7		Clauses in conditions of employment, or in contracts, of drivers that require adherence to noise minimisation procedures and facilitate effective implementation of the disciplinary actions for breaches of the procedures.		
3	**Ecological Considerations**			
3.1		The vegetation o the site will be cleared and managed in accordance with the Vegetation and Habitat Management Plan provided as Appendix 4 to the *Ecological Site Assessment* (Conacher Environmental Group, 2008) (refer to *Appendix F*), including the following: • Revegetation in *Management Area A*; • Regeneration in *Management Area B*; • Protected Habitat in *Management Area C*; and	Lismore City Council	Ongoing.

Item Number	Item	Commitment	Responsibility	Timing
		Vegetation removal in *Management Area D*.		
3.2		The Koala Plan of Management prepared by Conacher Travers (2006) (refer to *Appendix F*) will be implemented including: • Habitat protection works; • Habitat restoration works; • Traffic management controls; • Dog/ Feral Animal Management measures; and • Bushfire Management.	Lismore City Council	Ongoing.
3.3		Lismore City Council will provide at least 45 hectares of mature, vegetated land to be retained to offset the 10.2 hectares to be lost as a result of the proposed development. The offset will be provided at a rate of approximately 4:1. The 45 hectares will be the same vegetation type as that to be removed (Tall Open Forest) or a type of higher ecological significance (such as Lowland Rainforest EEC or Koala Habitat) and may be located at a single site or numerous sites that Council own in the LGA, which are suitable to be set aside for ecological preservation. Lismore City Council will undertake ecological assessments of any land proposed to be identified as a vegetation offset site and develop an offset strategy for submission to the DoP and DECC for approval, taking into consideration DECC's document *Principles for the Use of Biodiversity Offsets in NSW*. The provision of nest and roost boxes will only be a short term measure, that is, provided as a measure for the protection and conservation of fauna during felling of hollow-bearing trees.	Lismore City Council	Prior to the removal of the existing vegetation.
4	**Aboriginal Heritage**			
4.1		All site employees/contractors will undergo site induction training that includes stop work procedures if archaeological sites are discovered.	Lismore City Council	Ongoing.

Item Number	Item	Commitment	Responsibility	Timing
4.2		Information regarding heritage requirements will be made available on site for employees/contractors.	Lismore City Council	Ongoing.
4.3		If an Aboriginal item is found all work will cease and the police, relevant Aboriginal community groups and a suitably qualified archaeologist contacted.	Lismore City Council	Ongoing.
5	Noise			
5.1		The quarry will operate according to the following hours: • Monday to Friday: 7.00am to 6.00pm; and • Saturday: 7.00am to 3.00pm. No work will be undertaken on Sundays or public holidays.	Lismore City Council	Ongoing.
5.2		Speed limits within the quarry site will be restricted to 40km/h and compression braking prohibited.	Lismore City Council	Ongoing.
5.3		4 metre earth bunds will be constructed to the north east and south west of the new southern quarry pit and a 5 metre earth bund will be constructed to the south of the existing Jaw Crusher as illustrated in Figures C.2 and C.3 in Annex C of the revised Noise Assessment (ERM, 2009[1]) provided as Annex B to the report. During the short construction period for these bunds, the noise limits will be relaxed. Nearby residents will be notified when this work will take place.	Lismore City Council	Prior to the operation of the expanded quarry.
5.4		Attended noise monitoring and plant equipment audits will be undertaken.	Lismore City Council	Annually.
5.5		Plant will be relocated to greater pit depths as the floor of the quarry gets deeper.	Lismore City Council	Ongoing.

Item Number	Item	Commitment	Responsibility	Timing
5.6		Noise Management Plan – the licensee must develop a Noise Management Plan for the quarry which must incorporate but not be limited to, the following: • noise compliance; • noise limits; • blasting noise; and • road traffic noise.	Lismore City Council	Prior to the operation of the expanded quarry.
5.7		A noise compliance assessment (including airblast overpressure and ground vibration from blasting) shall be submitted to the DECC within three (3) months of commencement of expanded operations at the premises. The assessment shall be prepared by a suitable qualified and experienced acoustical consultant and shall assess compliance with noise and blasting limits presented in conditions 5.8 and 6.1 - 6.4.	Lismore City Council	Within 3 months of commencement of expanded operations.

Item Number	Item	Commitment	Responsibility	Timing
5.8		Noise from the premises must not exceed the sound pressure level (noise) limits presented in the Table below. Note: the limits represent the sound pressure level (noise) contribution at the nominated receiver locations in the table.	Lismore City Council	Ongoing.

Noise Limits (dB(A))				
Location (1)	Day(3)	Evening(4)	Night(5)	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{1(1\ minute)}$
[redacted]	38	N/A	N/A	N/A
[redacted]	35	N/A	N/A	N/A

(1) Receiver locations as identified in *Blakebrook Quarry Expansion – Environmental Assessment Report – Final Report Volume 1 (Report No. 0066641), Appendix C, ERM 2008.*;

(2) Noise limits may be exceeded by no more than 2dB(A) for a maximum of ten days in any reporting period during operation of the permanent jaw crusher;

(3) Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays;

(4) Evening is defined as the period from 6pm to 10pm on any day;

(5) Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.

[redacted]

Item Number	Item	Commitment	Responsibility	Timing
5.9		Noise from Blakebrook Quarry 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, to determine compliance with the noise level limits in Condition 5.8 unless otherwise stated.	Lismore City Council	Ongoing.
5.10		Where it can be demonstrated that direct measurement of noise from the Blakebrook Quarry is impractical, the DECC may accept alternative means of determining compliance. See Chapter 11 of the NSW Industrial Noise Policy. The modification factors presented in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.	Lismore City Council	Ongoing.
5.11		The noise emission limits identified in Condition 5.8 apply under meteorological conditions of wind speed up to 3 metres per second at 10 metres above ground level.	Lismore City Council	Ongoing.
6	**Blasting Limits**			
6.1		The overpressure level from blasting operations at the Blakebrook Quarry must not exceed 115dB (Lin Peak) for more than 5 per cent of the total blasts over each reporting period of 12 months. Error margins associated with any monitoring equipment used to measure this area are not to be taken into account in determining whether or not the limit has been exceeded.	Lismore City Council	Ongoing.
6.2		The overpressure level from blasting operations at the Blakebrook Quarry 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.	Lismore City Council	Ongoing.
6.3		Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 5mm/sec for more than 5 per cent of the total number of blasts over each reporting period of 12 months. 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.	Lismore City Council	Ongoing.

Item Number	Item	Commitment	Responsibility	Timing
6.4		Blasting operations at the premises may only take place between 9.00am-5.00pm Monday to Friday. (Where compelling safety reasons exist, the Authority may permit a blast to occur outside the abovementioned hours. Prior written (or facsimile) notification of any such blast must be made to the Authority. To determine compliance with Conditions 6.1-6.4: a) airblast overpressure and ground vibration levels must be measured and electronically recorded at the closest and potentially most exposed receiver location in L6.1 to the blast activity for all blasts carried out in or on the premises; and b) Instrumentation used to measure the airblast overpressure and ground vibration levels must meet the requirements of Australian Standard AS 2187.2-2006.	Lismore City Council	Ongoing.
7	**Air Quality**			
7.1		All unsealed haul routes on the site will be watered at a rate of 2 l/m²/minute as required.	Lismore City Council	Ongoing.
7.2		Water sprays will be used on all mobile crushing, stockpiles and screening equipment to minimise airborne particulate matter.	Lismore City Council	Ongoing.
7.3		All road trucks must have tarpaulin covers in place prior to leaving the weighbridge.	Lismore City Council	Ongoing.
7.4		A dust deposition gauge network will be developed to ensure compliance with cumulative dust deposition criteria.	Lismore City Council	At or before production rates at the quarry reach 337,500 tonnes/ annum.
7.5		Stockpiles are to be seeded to minimize the potential for fugitive dust.	Lismore City Council	Ongoing
8	**Groundwater Management**			

Item Number	Item	Commitment	Responsibility	Timing
8.1		A detailed groundwater assessment will be undertaken prior to the commencement of vertical extraction. This will involve the installation of nested ground water monitoring wells. The wells will be installed to at least two depths at a minimum of three separate locations around the perimeter of the quarry in order to intercept identified distinct water bearing zones.	Lismore City Council	Following approval of the quarry expansion and prior to the commencement of vertical extraction
8.2		A quarterly groundwater monitoring program will be undertaken as detailed in *Section 8.4.1* of the EA (ERM, 2009) and will involve analysis by a NATA laboratory.	Lismore City Council	Quarterly following approval of the quarry expansion and prior to the commencement of vertical extraction
8.3		Should it be determined that environmental flows from springs are being reduced by extraction activities, investigation will commence on supplementing flows using water collected in the quarry pit. Water collected in the quarry will have to meet water quality criteria before it is discharged, with discharge to be licensed under the DECC.	Lismore City Council	Ongoing.
9	**Surface Water Management**			
9.1		Clean run-off from the surround small sub-catchments will be diverted away from the quarry pits to existing ephemeral water courses. Water collected within the pits will be stored in in-pit dams and used for processing and dust suppression purposes. No quarry water is proposed to be discharged from the site as part of the proposed expansion activities.	Lismore City Council	Ongoing.

Item Number	Item	Commitment	Responsibility	Timing
10	Quarry Rehabilitation			
10.1		A progressive rehabilitation approach will be undertaken to make safe the site and to rehabilitate the site and benches to tie into the surrounding woodland. All on-site infrastructure will be removed.	Lismore City Council	Ongoing and on completion of quarrying.
10.2		Lismore City Council will commit to the ongoing allocation of funds for the progressive rehabilitation of the Quarry in the determination of its annual operational budget. The allocation of funds will be tied to demand and the output of the Quarry, with the allocation to be in the order of $30 000 to $50 000. The allocated money will be accumulated pending the availability of areas to be rehabilitated. The budget allocation may also be increased over the lifetime of the quarry to reflect inflationary changes and rehabilitation needs as necessary.	Lismore City Council	Ongoing and on completion of quarrying
10.3		A suitably qualified and experienced professional will be engaged to carry out on-going maintenance and monitoring. This will involve activities such as bushland rehabilitation, weed removal and nest box erection.	Lismore City Council	Upon commencement of rehabilitation activities and upon completion of quarrying.
10.4		The success of the rehabilitation program will be monitored in accordance with the *Mine Rehabilitation Handbook*.	Lismore City Council	Upon commencement of rehabilitation activities and upon completion of quarrying.

APPENDIX 3
RECEIVER LOCATION PLAN

Legend

Noise Logger

Noise Assessment Locations

Figure 2.1

Noise Assessment and Logging Locations

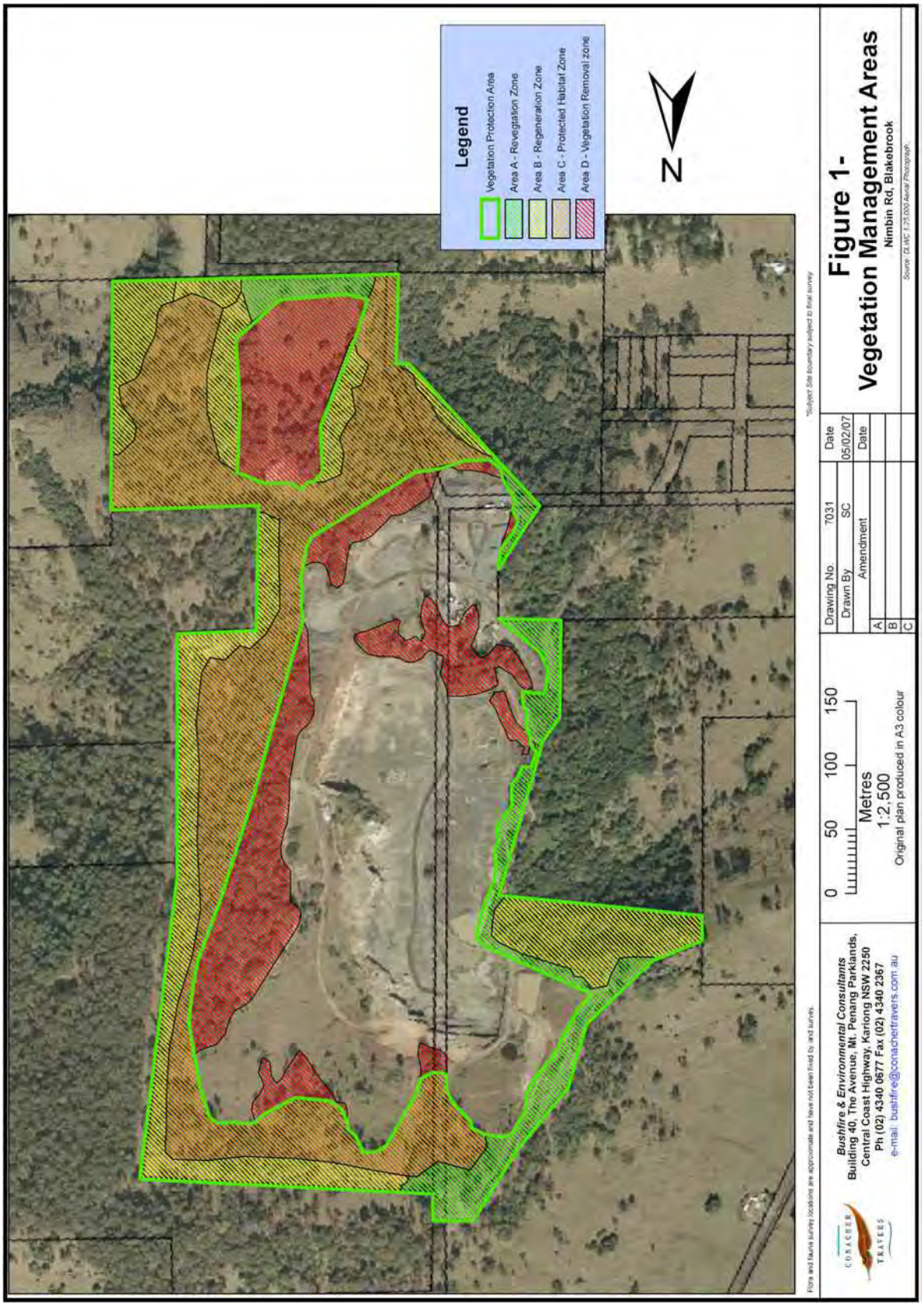
Client:	Lismore City Council	
Project:	Blakebrook Quarry Noise Assessment	
Drawing No:	0066641s_01_R1	
Date:	11/06/2009	Drawing size: A4
Drawn by:	GC	Reviewed by: MS
Source:	-	
Scale:	Not to Scale	

N

Environmental Resources Management Australia Pty Ltd
Building C, 33 Saunders St, Pyrmont, NSW 2009
Telephone +61 2 8584 8888

ERM

APPENDIX 4
BIODIVERSITY OFFSET STRATEGY



APPENDIX 5
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 13 of Schedule 3.

Compliance Monitoring

3. A noise compliance assessment must be undertaken within two months of commencing mining operations under EA (Mod 1). The assessment must be conducted by a suitably qualified and experienced acoustical practitioner and must assess compliance with the noise criteria in Table 2. A report must be provided to the Secretary and EPA within 1 month of the assessment.

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;
   (c) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration; and
   (d) the use of an appropriate modifying factor for low frequency noise to be applied during compliance testing at any individual residence if low frequency noise is present (in accordance with the INP) and before comparison with the specified noise levels in the approval.

Newton Denny Chapelle
SURVEYORS PLANNERS ENGINEERS

ATTACHMENT 2

DPE Comments of 2018 AEMR

Planning Services
Compliance
Contact: James Epstein
Phone: 02 6670 8650
Email: james.epstein@planning.nsw.gov.au

Our Ref: MP 07_0020 (#16858)

Ms [redacted]
Commercial Services Compliance Coordinator
Lismore City Council
PO Box 23A
Lismore 2480

7 May 2019

Dear [redacted]

Blakebrook Quarry (MP 07_0020)
Annual Environmental Management Report – 2018

I refer to the Blakebrook Quarry (the "**Site**") Annual Environmental Management Report (the "**AEMR**") covering the period from 1 January 2018 to 31 December 2018, that was submitted to the Department of Planning and Environment (the "**Department**") on 5 April 2019 by Lismore City Council (the "**Proponent**") (following the approval of an extension) in accordance with Schedule 5, Condition 11, of MP 07_0020, as modified (the "**Approval**").

The Department has reviewed the 2018 AEMR and considers it to be generally in accordance with the approval. However, the Department notes the following:

a) Schedule 2, Condition 19 – The Soil and Water Management Plan has been amended and approved with changes to monitoring frequency and trigger limits. Please ensure that during the 2019 reporting period that monitoring is undertaken in accordance with the amended plan and any exceedances of criteria reported to the Department as required;

b) Schedule 3, Condition 19 – The site water balance provided as Attachment 10 covers the 2017 reporting period. The Department notes that the 2018 water balance is currently available on the Proponent's website attached to the Soil and Water Management Plan. Please ensure that the consolidated AEMR updates Attachment 10 to the correct year and is uploaded to the Proponent's website by **17 May 2019**;

c) Schedule 3, Condition 29 and 30 – The Biodiversity and Rehabilitation Management Plan was updated and approved by the Department on 14 March 2019. An Independent Environmental Audit was submitted and review finalised by the Department on 24 April 2019. As noted by the Proponent in the AEMR, this triggers a review of the sum of the Biodiversity and Rehabilitation Bond. To satisfy the requirements of Schedule 3, Condition 30 this review must be complete and submitted to the Department by **14 May 2019** as this date is the first to occur.

The above requests should be tabulated within the next AEMR with details of how the issues have been addressed.

Should you have any queries following this review please do not hesitate to contact James Epstein as per the details above.

Yours sincerely,

[redacted]

[redacted]

Team Leader – Compliance
As nominee of the Secretary

Newton Denny Chapelle
SURVEYORS PLANNERS ENGINEERS

ATTACHMENT 3

EPA Licence 3384

Licence Variation

Licence - 3384

LISMORE CITY COUNCIL
ABN 60 080 932 837
PO BOX 23A
GOONELLABAH NSW 2480

Attention:

Notice Number	1577148
File Number	EF13/3226
Date	11-Mar-2019

NOTICE OF VARIATION OF LICENCE NO. 3384

BACKGROUND

LISMORE CITY COUNCIL ("the licensee") is the holder of Environment Protection Licence No. 3384 ("the licence") issued under the *Protection of the Environment Operations Act 1997* ("the Act"). The licence authorises the carrying out of activities at NIMBIN ROAD, BLAKEBROOK, NSW, 2480 ("the premises").

VARIATION OF LICENCE NO. 3384

1. By this notice the EPA varies licence No. 3384. The attached licence document contains all variations that are made to the licence by this notice.
2. The following variations have been made to the licence:
   - All Pollution Reduction Programs completed.

.....

[redacted]

Operation Officer

North - North Coast

(by Delegation)

Licence Variation

INFORMATION ABOUT THIS NOTICE

- This notice is issued under section 58(5) of the Act.
- Details provided in this notice, along with an updated version of the licence, will be available on the EPA's Public Register (http://www.epa.nsw.gov.au/prpoeo/index.htm) in accordance with section 308 of the Act.

Appeals against this decision

- You can appeal to the Land and Environment Court against this decision. The deadline for lodging the appeal is 21 days after you were given notice of this decision.

When this notice begins to operate

- The variations to the licence specified in this notice begin to operate immediately from the date of this notice, unless another date is specified in this notice.
- If an appeal is made against this decision to vary the licence and the Land and Environment Court directs that the decision is stayed the decision does not operate until the stay ceases to have effect or the Land and Environment Court confirms the decision or the appeal is withdrawn (whichever occurs first).

Environment Protection Licence

Licence - 3384

Licence Details	
Number:	3384
Anniversary Date:	17-January

Licensee

LISMORE CITY COUNCIL

PO BOX 23A

GOONELLABAH NSW 2480

Premises

LISMORE OR BLAKEBROOK QUARRY

NIMBIN ROAD

BLAKEBROOK NSW 2480

Scheduled Activity

Extractive activities

Fee Based Activity	Scale
Land-based extractive activity	> 100000-500000 T annual capacity to extract, process or store

Region

North - North Coast

NSW Govt Offices, 49 Victoria Street
GRAFTON NSW 2460

Phone: (02) 6640 2500

Fax: (02) 6642 7743

PO Box 498

GRAFTON NSW 2460

Environment Protection Licence

Licence - 3384

Environment Protection Licence

Licence - 3384

Environment Protection Licence

Licence - 3384

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 - 3384

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:

LISMORE CITY COUNCIL
PO BOX 23A
GOONELLABAH NSW 2480

subject to the conditions which follow.

Environment Protection Licence

Licence - 3384

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	> 100000 - 500000 T annual capacity to extract, process or store

A1.2 This licence regulates water pollution resulting from the activity/ies carried out at the premises specified in A2.

A2 Premises or plant to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
LISMORE OR BLAKEBROOK QUARRY
NIMBIN ROAD
BLAKEBROOK
NSW 2480
LOT 201 DP 1227138

A3 Other activities

A3.1 This licence applies to all other activities carried on at the premises, including:

Ancillary Activity
Bitumen Pre-mix or Hot-mix Industries

A4 Information supplied to the EPA

A4.1 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.

2 Discharges to Air and Water and Applications to Land

P1 Location of monitoring/discharge points and areas

P1.1 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.

P1.2 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
1	Wet weather overflow	Wet weather overflow	Spillway of the settlement dam at the southern end of the site nearest the weighbridge as identified on site map entitled Blake Brook Quarry Water Management dated 21 July 2005

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.

L1.2 Discharge of TSS to waters from Point 1 is permitted when the discharge occurs solely as a result of rainfall at the premises exceeding a total of 60.2 millimetres over any consecutive five day period.

L1.3 The licensee must take all practical measures to avoid or minimise generation of total suspended solids

Environment Protection Licence

Licence - 3384

L2 Concentration limits

L2.1 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table\s.

L2.2 Water and/or Land Concentration Limits

POINT 1

Pollutant	Units of Measure	50 Percentile concentration limit	90 Percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
Oil and grease (Wet)	milligrams per litre				10
pH	pH				6.5 -8.5
Total suspended solids	milligrams per litre				50

L2.3 For each monitoring/discharge point or utilisation area specified in the table\s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.

L2.4 Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.

L3 Waste

L3.1 The licensee must not cause, permit or allow any waste generated outside the premises to be received at the premises for storage, treatment, processing, reprocessing or disposal, excluding the following:

a) Glass sand recovered from the Lismore Recycling and Recovery Centre.

L4 Noise limits

L4.1 Noise from the licenced premise must not exceed an LAeq (15 minute) noise emission criterion of 36db(A) at Location 2 and 35db(A) at all other locations as stated in Section 4 of Schedule 3 within the Department of Planning - Section 75J of the Environmental Planning & Assessment Act 1979 - Blakebrook Quarry Project - Project No. 07_0020 , except as expressly provided by this licence.

L4.2 The noise limits set out in the preceding conditions apply under all meteorological conditions except for the following:
Wind speeds greater than 3 meters/second at 10 meters above ground level; or

Temperature inversion conditions greater than 3ºC/100 meters.

L5 Blasting

L5.1 The airblast overpressure level from blasting operations in or on the premises must not exceed:
a) 115 dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period; and
b) 120 dB (Lin Peak) at any time.
as measured at the nearest sensitive receiver

L5.2 The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed:

a) 5mm/s for more than 5% of the total number of blasts carried out on the premises during each reporting period; and
b) 10 mm/s at any time.

At the most affected residence or noise sensitive location that is not owned by the licensee or subject to a private agreement between the owner of the residence or noise sensitive location and the licensee as to an alternative ground vibration level .

L5.3 All sensitive receivers are to be given at least 24 hours notice when blasting is to be undertaken.

L6 Hours of operation

L6.1 Activities covered by this licence must be in accordance with the operating hours set out in the table below

Activity	Permissible Hours
Quarrying activities including loading and dispatch of trucks	07:00 to 18:00 Monday to Friday; 07:00 to 15:00 on Saturday and at no time on Sundays and Public Holidays
Blasting	10:00 to 15:00 Monday to Friday and at no time on Saturday, Sunday and Public Holidays
Asphalt plant	06:00 to 17:30 Monday to Saturday and at no time on Sundays and Public Holidays
Maintenance	May be conducted at any time provided that these activities are not audible at any privately-owned residence

L6.2 The following activities may be carried out outside the hours specified in Condition L6.1 above:

- delivery or despatch of material outside the hours of as requested by police or other public authorities
- emergency work to avoid the loss of lives, property or to prevent environmental harm
- operation of the asphalt plant with the permission of Lismore City Council for emergency or specific works where a traffic management problem is involved.

In such circumstances, prior notification must be provided to the EPA and affected residents as prior to

undertaking the activity or as soon as possible thereafter.

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 premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.

O4 Processes and management

O4.1 Sediment Basins shall be treated, if required, to reduce the Total Suspended Solids level to the licenced concentration limit before being discharged to the environment. Treatment can be with gypsum or any other material that has been approved by the EPA.

O4.2 The licensee must maximise the diversion of run-on waters from lands upslope and around the site whilst land disturbance activities are being undertaken.

O4.3 The licensee must maximise the diversion of stormwater runoff containing suspended solids to sediment basins installed on the premises.

O4.4 Where sediment basins are necessary, all sediment basins and associated drainage must be installed and commissioned prior to the commencement of any clearing or grubbing works within the catchment area of the sediment basin that may cause sediment to leave the site.

O4.5 The licensee must ensure the design storage capacity of the sediment basins installed on the premises is reinstated within 5 days of the cessation of a rainfall event that causes runoff to occur on or from the premises.

O4.6 The licensee must ensure that sampling point(s) for water discharged from the sediment basin(s) are provided and maintained in an appropriate condition to permit:
a) the clear identification of each sediment basin and discharge point;
b) the collection of representative samples of the water discharged from the sediment basin(s); and
c) access to the sampling point(s) at all times by an authorised officer of the EPA.

O4.7 The licensee must endeavour to maximise the reuse of captured stormwater on the premises.

O4.8 Each sedimentation basin must have a marker (the “sedimentation basin marker”) that identifies the upper level of the sediment storage zone.

O4.9 Whenever the level of liquid and other material in any sedimentation basin exceeds the level indicated by the sedimentation basin marker, the licensee must take all practical measures as soon as possible to reduce the level of liquid and other material in the sedimentation basin.

O4.10 The sediment basins must meet the design and operational standards of Managing Urban Stormwater Soils and Construction: Volume 1 and Volume 2 E. Mines and quarries. The sediment basin sizes have been calculated to total 20.05 ML as outlined in the Blakebrook Quarry Expansion - Soil and Water Management Sub-Plan - April 2011, prepared byEnvironmental Resources Management Australia on behalf of Lismore City Council

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

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 Water and/ or Land Monitoring Requirements

POINT 1

Pollutant	Units of measure	Frequency	Sampling Method
Oil and Grease	milligrams per kilogram	Special Frequency 1	Grab sample
pH	pH	Special Frequency 1	Grab sample
Total suspended solids	micrograms per litre	Special Frequency 1	Grab sample

M2.3 For the purposes of the table(s) above Special Frequency 1 means the collection of samples once during each discharge event arising from rainfall not exceeding the 90 percentile five day rainevent of 60.2mm falling in total over a period of up to five days..

M3 Testing methods - concentration limits

M3.1 Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.

M4 Environmental monitoring

M4.1 The licensee is required to install and maintain a rainfall depth measuring device.

M4.2 Rainfall at the premises must be measured and recorded in millimetres per 24 hour period, at the same time each day.

M5 Recording of pollution complaints

M5.1 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.

M5.2 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.

M5.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M5.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M6 Telephone complaints line

M6.1 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.

M6.2 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.

M6.3 The preceding two conditions do not apply until 3 months after: the date of the issue of this licence.

M7 Blasting

M7.1 To determine compliance with condition(s) L5.2 and L5.3:
a) Airblast overpressure and ground vibration levels must be measured at the most affected residence or noise sensitive location that is not owned by the licensee or subject to a private agreement between the owner of the residence or noise sensitive location and the licensee as to an alternative level - for all blasts carried out in or on the premises; and
b) Instrumentation used to measure the airblast overpressure and ground vibration levels must meet the requirements of Australian Standard AS 2187.2-2006.

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.

R1.8 The licensee must report any exceedence of the licence blasting limits to the regional office of the EPA as soon as practicable after the exceedence becomes known to the licensee or to one of the licensee's employees or agents.

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 - 3384

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

Licence - 3384

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 described 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

Licence - 3384

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

[redacted]

Environment Protection Authority

(By Delegation)

Date of this edition: 28-August-2000

Environment Protection Licence

Licence - 3384

End Notes

1	Licence varied by notice 1012134, issued on 02-Apr-2002, which came into effect on 27-Apr-2002.
2	Licence varied by notice 1017834, issued on 03-Jun-2002, which came into effect on 28-Jun-2002.
3	Licence varied by notice 1020616, issued on 12-Sep-2002, which came into effect on 07-Oct-2002.
4	Licence varied by notice 1026159, issued on 31-Mar-2003, which came into effect on 25-Apr-2003.
5	Licence varied by notice 1031250, issued on 03-Oct-2003, which came into effect on 28-Oct-2003.
6	Licence varied by notice 1045315, issued on 11-Mar-2005, which came into effect on 05-Apr-2005.
7	Licence varied by notice 1049382, issued on 25-Aug-2005, which came into effect on 19-Sep-2005.
8	Condition A1.3 Not applicable varied by notice issued on <issue date> which came into effect on <effective date>
9	Licence varied by notice 1508293 issued on 22-Aug-2012
10	Licence varied by notice 1525659 issued on 30-Nov-2015
11	Licence varied by notice 1558031 issued on 27-Nov-2017
12	Licence varied by notice 1568156 issued on 06-Aug-2018
13	Licence format updated on 13-Feb-2019

Newton Denny Chapelle
SURVEYORS PLANNERS ENGINEERS

ATTACHMENT 4A

Extractive Materials Return

July 2018 – June 2019

SALES During 2018-2019

Production information may be published in aggregated form for statistical reporting. However, production data for individual operations is kept strictly confidential.

Product	Description	Quantity Tonnes
Virgin Materials		
• **Crushed Coarse Aggregates**		
Over 75mm	Large rock,Raw feed,Gabion,Rockfill& Spalls	13234 Tonnes
Over 30mm to 75mm	Drainage cobble	243 Tonnes
5mm to 30mm	Aggregates	26029 Tonnes
Under 5mm	Crusher dust	15995 Tonnes
Natural Sand		
Manufactured Sand		
Prepared Road Base & Sub Base	DGB20, DGS20, DGS 40, RB20, RB40, Select 40	82039 Tonnes
Other Unprocessed Materials	overburden	45226 Tonnes
Recycled Materials		
• **Crushed Coarse Aggregates**		
Over 75mm		
Over 30mm to 75mm		
5mm to 30mm		
Under 5mm		
Natural Sand		
Manufactured Sand		
Prepared Road Base & Sub Base		
Other Unprocessed Materials		
• **River Gravel**		
Over 30mm		
5mm to 30mm		
Under 5mm		
• **Construction Sand**	Excluding Industrial	
• **Industrial Sand**		
Foundry, Moulding		
Glass		
Other (Specify)		
• **Dimension Stone**	Building, Ornamental, Monumental	
Quarried in Blocks		
Quarried in Slabs		
• **Decorative Aggregate**	Including Terrazzo	
• **Loam**	Soil for Topdressing, Garden soil, Horticultural purposes)	
• **TOTAL SITE PRODUCTION**		182766 Tonnes
• **Gross Value ($) of all Sales**	$3,789,094.00	
• **Type of Material**	Basalt	
• **Number of Full-Time Equivalent (FTE) Employees**	Employees: 8	Contractors Nil

Please Note: A return for clay based products can be obtained by contacting the inquiry number.

Form S 1

NSW GOVERNMENT | Planning, Industry & Environment

RETURN FOR EXTRACTIVE MATERIALS: YEAR ENDED 30 JUNE 2019

Quote RIMS ID in all correspondence

Quarry Id:1116001 Rims ID:400286

Operators Name: Lismore City council
Address: PO BOX 23A
Lismore
NSW2480

Email [redacted]@lismore.nsw.gov.au

Quarry Name: Northern Rivers Quarry
Quarry Address: 540 Nimbin Road Blakebrook

Inquiries please telephone: (02) 4063 6713

Completed or Nil Returns
Email – mineral.royalty@planning.nsw.gov.au
Postal Address (see below)

Please amend name, postal address and location of mine or quarry if incorrect or incomplete.

2018-2019

The return should be completed and forwarded to **Senior Advisory Officer, RESOURCE ECONOMICS, RESOURCE PLANNING & PROJECTS, NSW DEPARTMENT OF PLANNING, INDUSTRY & ENVIRONMENT, PO BOX 344 HUNTER REGION MAIL CENTRE NSW 2310 on or before 31 October 2019**. If completion of the return is unavoidably delayed, an application for extension of time should be requested **before** the due date. If no work was done during the year, a **NIL** return must be forwarded.

The return should relate to the **above quarrying establishment** and should cover the operations of quarrying and treatment (such as crushing, screening, washing etc.) carried out at or near the quarry. A return is required even if the operations are solely of a developmental nature and whether the area being worked is held under a mining title or otherwise.

Director, Resource Planning & Projects

Please complete all of the following information to assist in identifying the location of the Quarry

Typical Geology Basalt

Nearest Town to Quarry Lismore

Local Council Name Lismore City Council

Deposited Plan and Lot Number/s of Quarry Lot 102/ 817730, 200, 201/ 1013944

Email Address of Operator [redacted]@lismore.nsw.gov.au

Name of Owner or Licensee Lismore City Council

Postal Address of Licensee PO Box 23A, Lismore NSW 2480

Licence/Lease Number/s (if any)
From Mineral Resources NSW (Industry & Investment NSW) N/A

From Department of Lands or other Department N/A

If any output was obtained from land NOT held under licence from the above Departments, state the Name/s and Address/es of the Owners of the land

---

To the best of my knowledge, information entered in this return is correct and no blank spaces left where figures should have been inserted.

- **SIGNATURE of PROPRIETOR or MANAGER** [redacted] **DATE** 26/8/2019
- **CONTACT PERSON for this return** [redacted]
- **NAME** (Block letters) [redacted] **Telephone** 0448545882

Newton Denny Chapelle
SURVEYORS PLANNERS ENGINEERS

ATTACHMENT 4B

Stockpile and Production Report
January to December 2019

Quarry Stockpile Report 1.1.2019 - 31.12.2019

Product Name	Nett Weight Tonnes
Location Name: Pit 1 - Main	
Crushing - 10mm Aggregate	(7,984.60)
Crushing - 14mm Aggregate	(3,146.70)
Crushing - 20mm Aggregate	(764.90)
Crushing - 20mm Roadbase	(11,739.52)
Crushing - 7mm Aggregate	(5,155.20)
Crushing - Coarse Dust	(16,686.01)
Crushing - Gabien	(2,691.58)
NRQA RB20 Unspec Roadbase	(3,124.25)
Location Name: Pit 1 - Main	(51,292.76)
Location Name: Quarry Stockpiles	
NRQA Glass Sand	(98.30)
NRQA Large Rock	(732.48)
NRQA Overburden	(69,684.74)
NRQA Raw Feed	(10.66)
NRQA Rescreen	(132.12)
NRQA Spalls	(32.26)
Location Name: Quarry Stockpiles	(70,690.56)
	(121,983.32)

[DateIn] (>= 01-Jan-2019 12:00:00 AM AND <= 31-Dec-2019 11:59:59 PM)
[LocationID] IN ('Pit 1 - Main', 'Quarry', 'Quarry Crushing', 'Quarry Stockpiles')

Newton Denny Chapelle
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ATTACHMENT 5

2019 Quarry Truck Movements

Date	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
1st	PH	12		6	49		21	4	100	16	14	65
2nd	0			7	66	265	10	42	9	9		1
3rd	2	37	37	4	53	7	10	22	8	23	168	67
4th	0	23	8	0		44	9	223	6	0	1	2
5th		38	16	9	209	37	3	48	14		0	4
6th	2	39	16		67	38		53	6	87	3	0
7th	2	19	9	26	27	33	53	31		PH	3	
8th	3	7	0	46	44		4	24	43	7	5	74
9th	2			49	63	159	8	34	10	13		3
10th	6	126	49	84	50	PH	11		20	12	12	10
11th	1	20	16	34		36	14	190	15	1	27	5
12th		23	22	47	251	6	7	3	6		15	4
13th	14	40	14		23	67	28	12	7	33	76	1
14th	15	33	7	260	5	62	72	15		2	24	
15th	8	21	0	42	39		51	18	58	11	9	23
16th	10			32	35	171	53	5	3	3		0
17th	8	137	59	25	7	11	65		3	3	151	0
18th	4	28	0	28		31	64	53	2		24	2
19th		26	7	PH	109	12	41	12	0		65	1
20th	45	22	8	PH	26	63		10	0	19	33	2
21st	5	11	6	127	41	52	274	16		14	15	HOLS
22nd	11	2	8	PH	69		30	9	8	42	14	5
23rd	37			41	25	169	37	17	7	100		HOLS
24th	32	89	29	2	46	47	48	29	10	85	151	HOLS
25th	25	10	5	PH		12	46	93	2	38	33	PH
26th		8	12	39	207	23	47	61	38		25	PH
27th	110	7	1	31	63	16		26	32	279	0	HOS
28th	PH	12	9	113	54	21	208	7		81	6	HOLS
29th	7		5	37	62		60	3	89	38	1	0
30th	12			4	44	119	65	3	39	14		HOLS
31st	6		32		42		30			21		HOLS
Total	196	401	169	567	1000	618	762	504	237	533	547	102
Avg	7.54	16.04	6.26	21.81	38.46	23.77	28.22	18.67	9.48	19.74	21.04	3.92

Newton Denny Chapelle
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ATTACHMENT 6

Section 94 Levies 2019

Ledger Account	Date	Posting Year	Posting Period	Type	Reference	Actual	Total Value	Transaction Description
001721.0785.9915	31/01/2019	2019	7	9901	11380/2019	4829.23	4829.23	Section 94 Levies Blakebrook Quarry
001721.0785.9915	28/02/2019	2019	8	9901	11459/2019	8140.71	8140.71	Section 94 contributions February 2019
001721.0785.9915	31/03/2019	2019	9	9901	11510/2019	3820.03	3820.03	Section 94 Levies & Admin for Blakebrook Quarry
001721.0785.9915	30/04/2019	2019	10	9901	11606/2019	17545.53	17545.53	Quarry Section 94 Levies April 2019
001721.0785.9915	31/05/2019	2019	11	9901	11689/2019	27522.28	27522.28	Blakebrook Quarry S94 Levies May 2019
001721.0785.9915	30/06/2019	2019	12	9901	11758/2019	15670.41	15670.41	Section 94 Levies Quarry June 2019
001721.0785.9915	31/07/2019	2020	1	9901	12000/2020	23222.13	23222.13	Section 94 Levies Blakebrrok Quarry July 2019
001721.0785.9915	31/08/2019	2020	2	9920	12176/2020	13737.37	13737.37	Blakebrook quarry S94 Levies August 2019
001721.0785.9915	30/09/2019	2020	3	9901	12235/2020	5945.83	5945.83	Section 94 Levies Blakebrook September 2019
001721.0785.9915	31/10/2019	2020	4	9901	12310/2020	11679.25	11679.25	Section 94 Contributions October 2019
001721.0785.9915	30/11/2019	2020	5	9901	12335/2020	7838.2	7838.2	Section 94 Levies Blakebrook Quarry November 2019
001721.0785.9915	31/12/2019	2020	6	9901	12418/2020	1377.62	1377.62	Section 94 Levies Quarry December 2019

Newton Denny Chapelle
SURVEYORS PLANNERS ENGINEERS

ATTACHMENT 7

Noise Monitoring Report 2019

Ambience Audio Services
Acoustic Measurement and Analysis

15 Tamarind Close
Richmond Hill NSW 2480

Phone: 02 6625 1733
Mobile: 0429 405 070

Results of Noise Monitoring

Blakebrook Quarry
550 Nimbin Road
Blakebrook NSW 2480

Prepared for

Northern Rivers Quarry & Asphalt
550 Nimbin Road
Blakebrook NSW 2480

Prepared by

[redacted]

December 17th 2019

Table of Contents

1 INTRODUCTION

Ambience Audio Services conducted noise monitoring of quarry operations for Northern Rivers Quarry & Asphalt at Blakebrook via Lismore, northern NSW. The noise monitoring was requested by [redacted], Compliance Officer for Commercial Services at Lismore City Council, to measure and report on quarry operational noise levels at the identified affected residential receiver locations.

Noise monitoring was conducted on the 6th of November and 10th of December 2019 with full quarry operating conditions and suitable weather conditions. The noise monitoring at Receiver 8 was conducted on the 10th of December as information in the new Noise and Blast Management Plan Version 3.1 (ERM Aug. 2018) was only received after the measurements on the 6th of November had been reported.

Quarry operations while noise monitoring was conducted included crushing, screening and stockpiling on the eastern side of the quarry floor, rock breaking on the quarry floor, asphalt production at the mobile plant at the top of the quarry and trucks and loaders on the quarry floor and internal haul roads. A diagram of equipment operating on the quarry floor during noise monitoring at residential receivers is provided in Appendix D.

To assist with the interpretation of some of the terminology used in this report, Appendix A provides definitions of acoustic terms. Appendix B is a chart of everyday sound pressure levels.

2 NOISE MONITORING REQUIREMENTS

The noise monitoring requirements for the Blakebrook Quarry are outlined in Section 2.2, Sections 7.1, 7.2, 7.4, 7.4, 7.5 and 7.7 of the Noise and Vibration Management Plan Version 3.1 (Aug 2018) prepared by Environmental Resources Management Australia Pty Ltd (ERM).

Extracts of the relevant parts are copied below.

Section 2.2

3. The Proponent must ensure that the noise generated by the project does not exceed the criteria in Table 2 at any residence on privately-owned land.

Table 2: Noise criteria dB(A)

Receiver	*Day* L_{Aeq} *(15 minute)*
Location 2	*36*
All other locations	*35*

Noise generated by the project is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy. Appendix 5 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 2 do not apply if the Proponent has an agreement with the relevant landowner to exceed the noise criteria, and the Proponent has advised the Department in writing of the terms of this agreement.

L6.1 Noise from the premises must not exceed:

(a) 35dB(A) LAeq(15 minute) during the day (7am to 6pm) Monday to Saturday;

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

7.1 MONITORING OBJECTIVES

The noise measurement procedures employed throughout the monitoring program shall be guided by the requirements of AS 1055-1997 "Acoustics - Description and Measurement of Environmental Noise" and the NSW EPA Noise Policy for Industry (EPA, 2017).

7.2 MONITORING LOCATIONS

The Noise Assessment (ERM, 2009) included seven noise monitoring locations that were used throughout the assessment, based on proximity to nearby potentially sensitive receptors. Given the proximity between monitoring locations and the location of anticipated noise-generating plant and equipment, the monitoring locations have been revised and separated into **primary** and **supplementary** acoustic monitoring locations for the purposes of this NBMP.

Primary and supplementary acoustic monitoring locations are identified in ***Figure 1.3.*** Primary acoustic monitoring locations consist of **locations 2, 4** and **8**, with the remainder consisting of supplementary acoustic monitoring locations.

An agreement was reached with the landowner located along Nimbin Road (previously identified as location 8, ERM 2009) in April 2016, wherein the landowner has agreed to exceedances in noise levels from quarry operations. As such the location has been removed as a primary acoustic monitoring location, and a new monitoring location selected.

Primary monitoring locations will be utilised during noise compliance monitoring and are considered representative in determining compliance with the relevant Conditions of Approval.

7.4 METHODOLOGY

Noise

Operator attended noise measurements shall be conducted at all primary acoustic measurement locations (Locations 2, 4 and 9 - refer ***Figure 1.3***) to quantify and characterise the maximum (LAmax), the energy equivalent (LAeq), and background (LA90) noise levels from ambient noise sources and quarrying operations over a 15 minute measurement period.

The operator shall quantify noise emissions and estimate the LAeq (Period) noise contribution during day time activities from each of the quarrying operations, as well as the overall level of ambient noise.

During attended monitoring, digital recordings will be conducted to allow for additional post analysis of the quarry noise levels and source identification.

All acoustic instrumentation employed throughout the monitoring program shall meet with the requirements of AS 1259.2-1990, "Sound Level Meters".

Instrument calibration shall be checked before and after each measurement survey, with the variation in calibrated levels not exceeding ±0.5 dBA.

7.5 METEOROLOGICAL PARAMETERS

Adverse meteorological conditions have the potential to increase noise levels, for example wind speeds up to 3m/s or temperature inversions, however wind speeds above 5m/s (and rainfall) have the potential to generate extraneous and erroneous noise events, which reduce the accuracy and confidence in measured data.

As such, meteorological parameters will be evaluated prior to undertaking works on site, to gain an understanding of the weather conditions and the potential for variations in noise levels.

All noise measurements shall be accompanied by both qualitative description (including cloud cover, approximate wind direction and speed) and quantitative measurements of prevailing local weather conditions throughout the survey period. Rainfall data will be collected from the rain gauge located on-site. All other weather data for the monitoring period will be purchased from the Bureau of Meteorology (BoM) website for the Lismore Observation Station, which is programmed to continuously record the meteorological parameters as shown in *Table 7.1*.

Table 7.1 Meteorological Measurement Parameters

Measured Parameter	Unit	Sample Interval
Mean Wind Speed	m/s	15 minutes
Mean Wind Direction	degrees	15 minutes
Aggregate Rainfall	Mm	15 minutes
Mean Air Temperature	C°	15 minutes

Modifying Factor Corrections

Factor	Assessment and Measurement	When to Apply	Correction	Comment
Tonal Noise	One-third octave or narrow band analysis.	Level of one-third octave band exceeds the level of the adjacent bands on both sides by: • 5 dB or more if the centre frequency of the band containing the tone is above 400 Hz. • 8 dB or more if the centre frequency of the band containing the tone is 160 to 400 Hz inclusive. • 15 dB or more if the centre frequency of the band containing the tone is below 160 Hz.	5 dB	Narrow-band frequency analysis may be required to precisely detect occurrence.
Low Frequency Noise	Measurement of C-weighted and A-weighted level.	Measure/assess C and A weighted levels over same time period. Correction to be applied if the difference between the two levels is 15 dB or more.	5 dB	C-weighting is designed to be more responsive to low-frequency noise.

Noise monitoring at locations 1, 2, 3, 4 and 8 were conducted within 30m of the residential dwelling in the direction of the quarry. Location 6 was conducted at the road frontage, approximately 35m from the residential dwelling, as the property had dogs and horses in the house paddock.

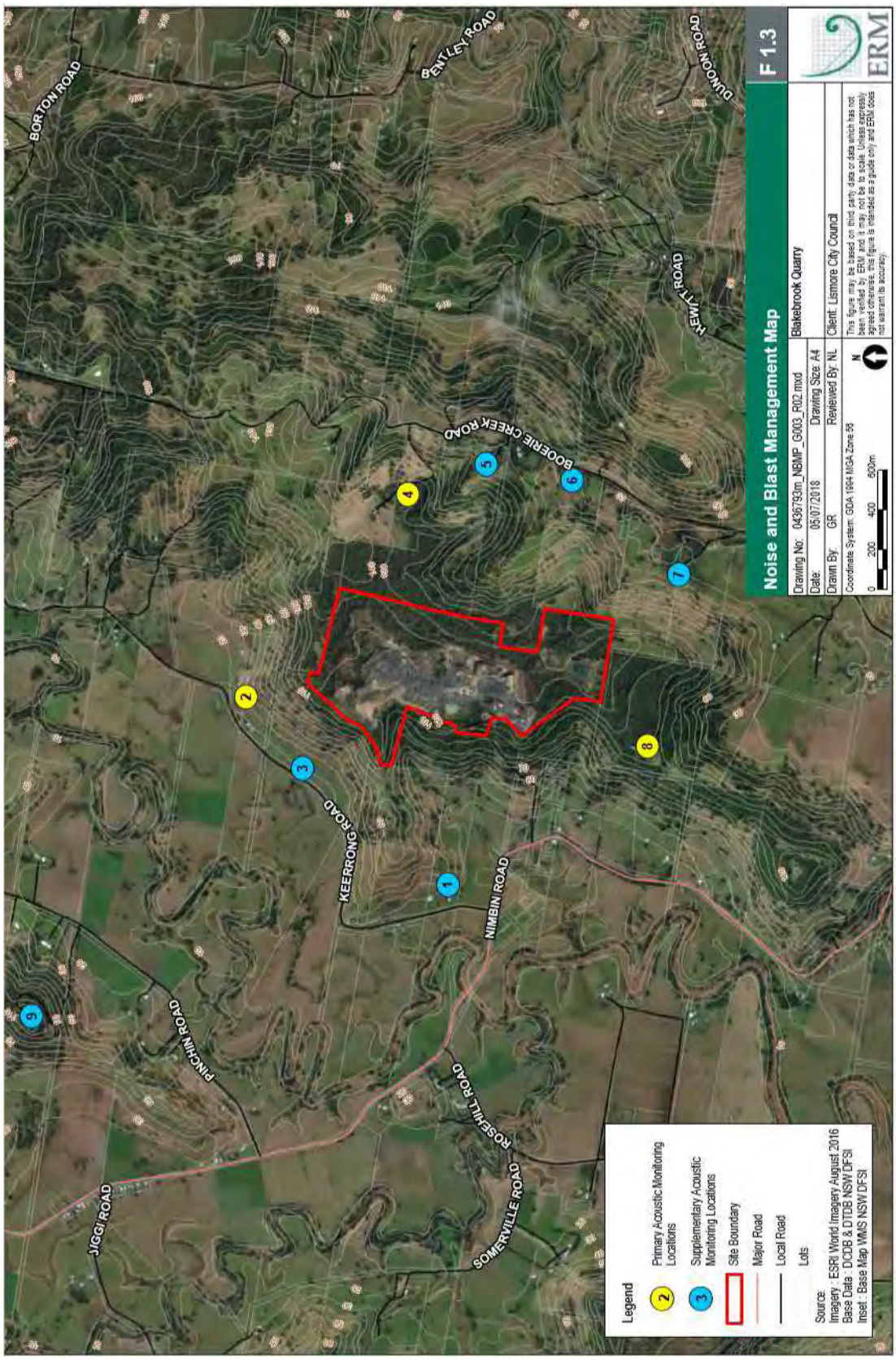
Table 2.1 Noise Monitoring Receiver Locations

Original Receiver Location	V3.1 Receiver Location	Street Address
1	1	[redacted] Keerrong Rd Blakebrook
2	3	[redacted] Keerrong Rd Blakebrook
3	2	[redacted] Keerrong Rd Blakebrook
4	4	[redacted] Booerie Creek Road Booerie Creek
6	6	[redacted] Booerie Creek Rd Booerie Creek
8	8	[redacted] Nimbin Rd Blakebrook

Primary Location

Note:
Some street addresses on Keerrong Road have been changed from previous assessments due to updated surveying.
Receiver 1 was 122 now 28
Receiver 3 was 126 now 166

Figure 2.1 Noise Monitoring Locations N&BNMP V3.1



3 MEASUREMENT PROCEDURE AND RESULTS

3.1 Instrumentation

Table 3.1 Instrumentation for Noise Monitoring

Instrument	Serial #	Calibration Date
Brüel and Kjær 2250L Sound Level Meter	3006868	July 2019
Brüel and Kjær 2250 Sound Level Meter	3008548	December 2019
Brüel and Kjær 2250L Sound Level Meter	2602785	October 2018
Svan SV30 Acoustic Calibrator	3849	July 2019
Brüel and Kjær Acoustic Calibrator	2292735	Dec 2019

The sound level meters (SLM) used during the noise survey conform to Australian Standard 1259 "Acoustics - Sound Level Meters", (1990) as type 1 precision sound level meters and have an accuracy suitable for both field and laboratory use.
The meters' calibrations were checked before and after the measurement periods with a Svan SV30 acoustic calibrator on the 6/11/2019 and a Bruel & Kjaer acoustic calibrator on the 10/12/2019. No significant system drift occurred over the measurement periods.

The SLMs and calibrators have been checked, adjusted and aligned to conform to the factory specifications and issued with conformance certificates by a certified NATA facility.

3.2 Measurement Procedures

Measurements were made in general accordance with procedures laid down in:

1. **Australian Standard AS 1055.1-1997: '**Acoustics - Description and measurement of environmental noise - General procedures';

2. **The NSW Government Noise Policy for Industry (EPA Oct 2017**

The microphone of a B&K 2250 SLM was mounted on a 1.5m high tripod and a Bruel and Kjær outdoor windscreen fitted to the microphone. The SLM was located on a flat area of land above the cliff face where the working equipment was operating, to monitor noise levels while measurements were being conducted at the receiver locations (*see Appendix D*). The SLM was set to record continuously for the duration of receiver monitoring with 1 second samples. A sound recording was conducted simultaneously.

The microphone of another B&K 2250 SLM was mounted on a 1.5m high tripod and a Bruel and Kjær outdoor windscreen fitted to the microphone. The SLM was used at the various receiver locations to monitor noise levels while the quarry was operating under full load conditions. The noise monitoring location was within 30m of the residential dwelling in the general direction of the quarry depending on vegetation and cattle in paddocks for receivers 1- 4 and receiver 8.

Noise monitoring at receiver 6 was conducted on the road frontage boundary approximately 35 from the residential dwelling as there were dogs and horses in the house paddock.

A 15 minute period was recorded at each location with 1 second samples with a simultaneous sound recording.

3.3 Weather Conditions

Weather conditions were generally good for acoustic measurements. Observations were taken at each receiver location with a Kestrel 3000 pocket weather meter.

Table 3.2 Observed Weather Conditions at Receiver Locations

Receivers Weather Summary 6th Nov & 10th Dec 2019								
Date	Time	Receiver	Temp	Relative Humidity	Wind	Wind Dir	Cloud Cover	
			℃	%	Speed (m/s)			
6/11/2019	9:55am	4	25	38	0.5 – 2.0	S	0/8	
	10:30am	6	25	34	0.1 – 1.5	S	0/8	
	11:10am	1	26	28	0.5 – 1.5	SE	0/8	
	11:40am	2	27	30	0.5 – 1.5	SE	0/8	
	12:05pm	3	28	25	0.5 – 2.0	SW	0/8	
10/12/2019	12:30pm	8	36	37	0.5 – 1.5	N	0/8	

Data from the local weather station near the weighbridge at NRQA is presented in Table 3.3.

Table 3.3 NRQA Local Weather Station

NRQA Local Weather Station 6th Nov & 10th Dec 2019						
		Temp °C	Relative Humidity %	Wind		
				Dir.	Speed	
Date	Time				(km/h)	(m/s)
6/11/2019	09:00am	15.2	70	E	0	0
	09:30am	17.6	62	NNE	0	0
	10:00am	20.4	52	NE	0	0
	10:30am	22.4	39	ENE	0.8	0.2
	11:00am	23.9	36	ENE	0.8	0.2
	11:30am	24.2	34	W	1.6	0.4
	12:00pm	25.7	32	ENE	1.6	0.4
	12:30pm	21.4	70	NE	1.6	0.4
10/12/2019	11:00am	30.2	62	ENE	1.6	0.4
	11:30am	31.2	57	NNE	1.6	0.4
	12:00pm	32.7	52	NE	3.2	0.9
	12:30pm	34.1	47	NE	3.2	0.9

The meteorological data for Lismore Airport (approximately 7kms to the south) for the monitoring period was downloaded from the Bureau of Meteorology website and provided in Table 3.4.

Table 3.4 Weather Observations at Lismore Airport

Lismore Airport Weather 6th Nov & 10th Dec 2019						
		Temp °C	Relative Humidity %	Wind		
				Dir.	Speed	
Date	Time				(km/h)	(m/s)
6/11/2019	09:00am	20.9	55	SW	17	4.7
	09:30am	21.7	35	SW	17	4.7
	10:00am	22.6	34	S	17	4.7
	10:30am	22.7	31	S	15	4.2
	11:00am	23.4	29	SSE	11	3
	11:30am	24.3	27	SE	6	1.7
	12:00pm	25.2	24	ESE	15	4.2
	12:30pm	25.6	24	WSW	11	3
10/12/2019	11:00am	32.0	48	NW	15	4.2
	11:30am	32.1	42	N	19	5.3
	12:00pm	33.7	37	NNW	20	5.5
	12:30pm	34.4	37	N	17	4.7

3.3 Measurement Results

Table 3.5 Measurement Results 6/11/2019

Measurement Summary 6th Nov 2019								
Measurement	Start Time	Elapsed Time (h:mm:ss)	L_{AFmax} [dB]	L_{Ceq} [dB]	L_{Aeq} [dB]	L_{Ceq}-L_{Aeq} [dB]	L_{AF10} [dB]	L_{AF90} [dB]
Receiver 1	10:59:43 AM	0:15:00	60.8	53.8	41.0	12.8	42.5	32.4
Receiver 3 (2)	11:33:00 AM	0:15:00	76.8	55.3	47.3	8.0	46.7	27.7
Receiver 2 (3)	11:59:59 AM	0:15:00	54.9	61.0	38.8	22.2	43.2	27.1
Receiver 4	9:49:50 AM	0:15:00	55.7	45.0	36.8	8.2	38.5	30.3
Receiver 6	10:26:07 AM	0:15:00	66.7	53.2	43.1	10.1	41.8	30.4
Top of Quarry	8:20:10 AM	4:17:56	91.4	75.6	79.1	3.5	79.1	64.9

(previous receiver number)

Table 3.6 Measurement Results 10/12/2019

Measurement Summary 10th Dec 2019								
Measurement	**Start Time**	**Elapsed Time** (h:mm:ss)	**L_{AFmax} [dB]**	**L_{Ceq} [dB]**	**L_{Aeq} [dB]**	**L_{Ceq}-L_{Aeq} [dB]**	**L_{AF10} [dB]**	**L_{AF90} [dB]**
Receiver 8 M1	11:53:10 AM	0:15:00	62.2	53.6	39.9	13.7	42.4	34.9
Receiver 8 M2	12:08:56 PM	0:15:00	55.1	55.8	42.3	13.5	45.7	35.4
Top of Quarry	11:17:43 AM	1:34:08	86.3	79.6	74.1	5.4	77.2	67.1

Note:
The above results are the ambient noise levels and includes noise from the rural surroundings and quarry noise if audible.

Table 3.7 Noise Observations at Receiver Locations

Noise Observations at Receiver Locations (All measurements 15 mins)			
Receiver	**Start Time**	**Observed Noise Sources**	**Quarry Noise**
1	10:59am	Birds, wind in trees, occasional local traffic on Keerrong Rd, distant cattle, distant traffic on Nimbin Rd, banging shed door	Quarry not audible
3 (2)	11:33am	Birds, wind in trees, occasional local traffic on Keerrong Rd, cattle, occasional water pump	Quarry barely audible
2 (3)	11:59am	Birds, wind in trees, occasional local traffic on Keerrong Rd, distant cattle, occasional insects	Quarry just audible at times.
4	9:49am	Birds, wind in trees, distant dogs, occasional distant vehicle	Quarry not audible
6	10:26am	Birds, wind in trees, distant dogs	Quarry not audible
8 M1	11:53am	Birds, insects, wind in trees, distant traffic Nimbin Rd, distant overhead aircraft	Occasional noise from rock hammer
8 M2	12:08pm	Birds, insects, wind in trees, distant traffic Nimbin Rd, distant overhead aircraft	Consistent intermittent noise from rock hammer

(previous receiver number)

4 DISCUSSION OF RESULTS

The measurements were undertaken while the quarry was operating under normal operating conditions (*see Appendix D for diagram for location of equipment*). A second noise logger was located above the quarry floor as a reference for quarry crushing operations noise levels whilst measurements were conducted at receivers.

Graph C.6 is the measured noise levels above the crushing operations on the 6th of November. The noise logger was located approximately 50m to the closest machine and approximately 100m to the farthest. The levels are very consistent throughout the receiver monitoring period 9:45am – 12:15pm. The levels are slightly higher during the 8:20am – 9am period as the rock breakers were working closer to the noise monitor for that period.

Graph C.9 is the measured noise levels above the crushing operations on the 10th of December. The noise logger was located approximately 50m to the closest machine and approximately 100m to the farthest. The levels indicate a reduction between 11:46am and 12:07pm and is due to the rock hammer not operating for that period.

Receiver 1 - quarry noise was not audible. The $L_{A90,15min}$ was 32.4 dB(A) and mainly attributed to wind in trees. It is estimated that the quarry $L_{Aeq,15\ min}$ is below 32 dB(A).

Receiver 2 (Previously R3) - quarry noise was just audible at times. The $L_{A90,15min}$ is quite low (27.1 dB(A). The 22 dB difference between L_{Aeq} and L_{Ceq} was attributed to wind. It is estimated that the quarry $L_{Aeq,15\ min}$ is below 30 dB(A).

Receiver 3 (Previously R2) - quarry noise was barely audible. The $L_{A90,15min}$ is quite low (27.7 dB(A) as on previous occasions. It is estimated that the quarry $L_{Aeq,15\ min}$ is below 30 dB(A).

Receiver 4 - quarry noise was not audible. The $L_{A90,15min}$ was 30.3 dB(A) and mainly attributed to wind in trees. It is estimated that the quarry $L_{Aeq,15\ min}$ is below 30 dB(A).

Receiver 6 - quarry noise was not audible. The $L_{A90,15min}$ was 30.4 dB(A). It is estimated that the quarry $L_{Aeq,15\ min}$ is below 30dB(A).

Receiver 8 M1 – 11:53am – 12:08pm – Occasional rock hammer at end of monitoring period. Graph C.9 indicates that the rock hammer was not operating for most of this period. Only operating approximately for the last minute.

Receiver 8 M1 – 12:08pm – 12:23pm – Rock hammer intermittent consistent level above background.

Receiver 8 – The background levels are very similar for the 2 measurements M1 – no rock hammer- M2 with rock hammer. The L_{AFmax} levels of the rock hammer were between 35 and 39 dBA. The crushing operations were not audible. Wind in trees was the main contributor to the background noise levels in both measurements which are similar in level.

There was consistent moving foliage noise during the first 2 -3 minutes of M2 which increased the total noise levels. It was noted that the wind was coming almost from the direction of the quarry.

Graph C.9 indicates that the rock hammer is approximately 10 -12 decibels higher than the crushing operations when measured at the top of the quarry. It is estimated that the crushing noise levels are approximately 25 – 30 decibels at Receiver 8. It is estimated that with the intermittent rock hammer operating the combined quarry noise levels are 31-33 decibels LAeq,15 min at Receiver 8.

No tonality was observed at any receiver location.

5 SUMMARY

A noise monitoring survey was conducted to assess compliance of quarry operational noise levels at the Northern Rivers Quarry and Asphalt facility at Blakebrook. Measurements were undertaken with calibrated noise monitoring equipment on the 6th of November and 10th of December 2019 and conducted in general accordance with procedures laid down in Australian Standard AS 1055.1-1997 and the NSW Noise Policy for Industry.

The Blakebrook Quarry operates under EPL No. 3384. Condition L6.1 stipulates that noise from the premises must not exceed 35dB(A) $L_{Aeq,15min}$ during the day (7am to 6pm) Monday to Saturday. The current Noise and Blast Management Plan V3.1 (Aug 2018) allows a limit of 36dB(A) $L_{Aeq,15min.}$ at Receiver 2 (previously Receiver 3).

Measurements were conducted at 6 receiver locations while the quarry was operating under load conditions. The quarry was not audible at receiver locations 1, 4 and 6. The quarry was just audible at times at receiver locations 2 and 3. The rock hammer was audible at Receiver 8.

The quarry operational noise levels ($L_{Aeq,15min}$) were not able to be accurately assessed at residential receiver monitoring locations as the quarry noise was not audible or barely audible against other noise sources such as moving foliage.

It is estimated from the recorded $L_{A90,15\ min}$ levels and observations, that the quarry noise levels are below the Project Specific Noise Level of 35 dB(A) $L_{eq,15mins}$ at Receiver locations 1, 2, 3, 4, 6 and 8.

As Receiver 8 is close to the southern cell, it is recommended that noise monitoring be conducted at Receiver 8 when work in the southern cell is undertaken.

[redacted]
Acoustic Consultant
Ambience Audio Services

APPENDIX A
Definitions of Terms

Sound pressure level (SPL): A measurable quantity of the size or amplitude of the pressure fluctuations (sound waves) above and below normal atmospheric pressure. Sound pressure levels are measured in decibels.

Decibels (dB): a ratio of energy flows. When used with sound measurement, it is the ratio between a measured quantity and an agreed reference level. The dB scale is logarithmic and uses the threshold of hearing of 20 μPa (micro pascals) as the reference level. This reference level is defined as 0 dB.

One useful aspect of the decibel scale is that it gives a much better approximation to the human perception of relative loudness than the Pascal scale. This is because the ear reacts to a logarithmic change in level, which corresponds to the decibel scale where 1 dB is the same relative change every on the scale. *Refer Appendix B*

Tonality: Noise containing a prominent frequency and characterized by a definite pitch.

Spectral characteristics: The frequency content of noise.

"A" frequency weighting: The method of frequency weighting the electrical signal within a noise-measuring instrument to simulate the way the human ear responds to a range of acoustic frequencies. The symbols for the noise parameters often include the letter "A" (e.g., L_{Aeq}, dBA) to indicate that frequency weighting has been included in the measurement.

Fast, Slow and Impulse time weightings: Standardised response times to help define fluctuating noise levels. Impulsive noises have high peak levels with a very short duration (e.g., gun shot), or a sequence of such peaks. Slow helps average out the fluctuations and is used to for better visual indication of the noise source. Environmental assessment standards usually specify the time weighting (**F**, **S**, or **I**) to use.

L_{Aeq}: The A-weighted continuous noise level. A widely used noise parameter that calculates a constant level of noise with the same energy content as the varying noise signal being measured. The time in minutes, which the measurement was sampled, is indicated with a following number. e.g. L_{Aeq15} is a 15 minute sample.

L_{AN}: The A-weighted sound pressure level that is exceeded for N per cent of the time over which a given sound is measured. e.g. **L_{A90}** is the A-weighted sound pressure level that is exceeded for 90% of the time over which a given sound is measured. L_{A90} is commonly used to describe the **background noise level** for community noise assessments.

Ambient noise: The all-encompassing noise associated within a given environment. It is the composite of sounds from many sources, both near and far.

Extraneous noise: Noise resulting from activities that are not typical of the area. Atypical activities may include construction, and traffic generated by holiday periods and by events such as concerts or sporting events. Normal daily traffic is not to be considered extraneous.

Background noise: The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is described using the $\mathbf{L_{A90}}$ descriptor.

Intrusive Noise: Refers to noise that intrudes above the background level by more than 5 decibels.

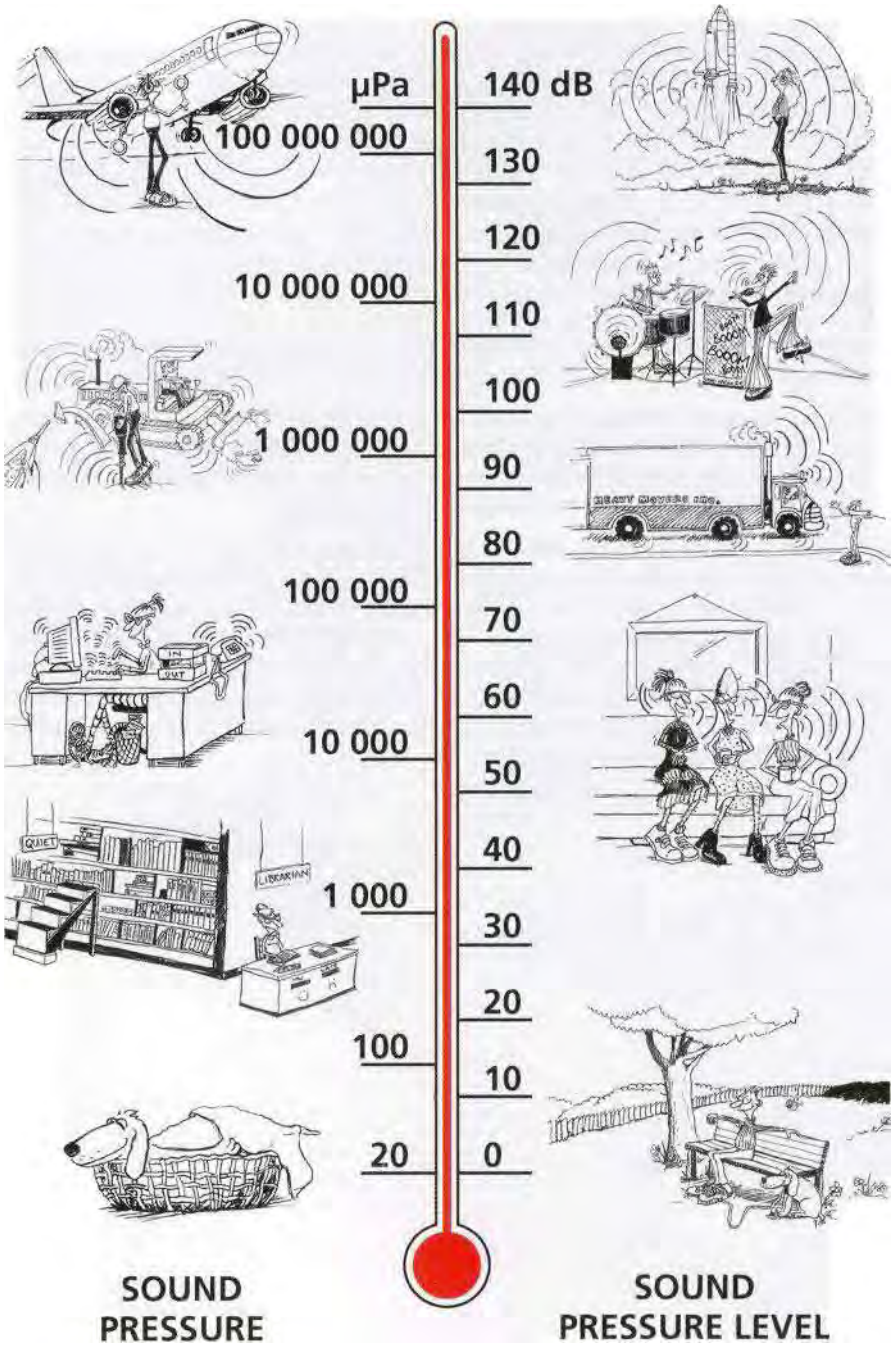
References:

Measuring Sound Brüel and Kjær Sound & Vibration Measurements A/S September 1984

Environmental Noise Brüel and Kjær Sound & Vibration Measurements A/S 2000, 2001

New South Wales Industrial Noise Policy NSW Environment Protection Authority January 2000

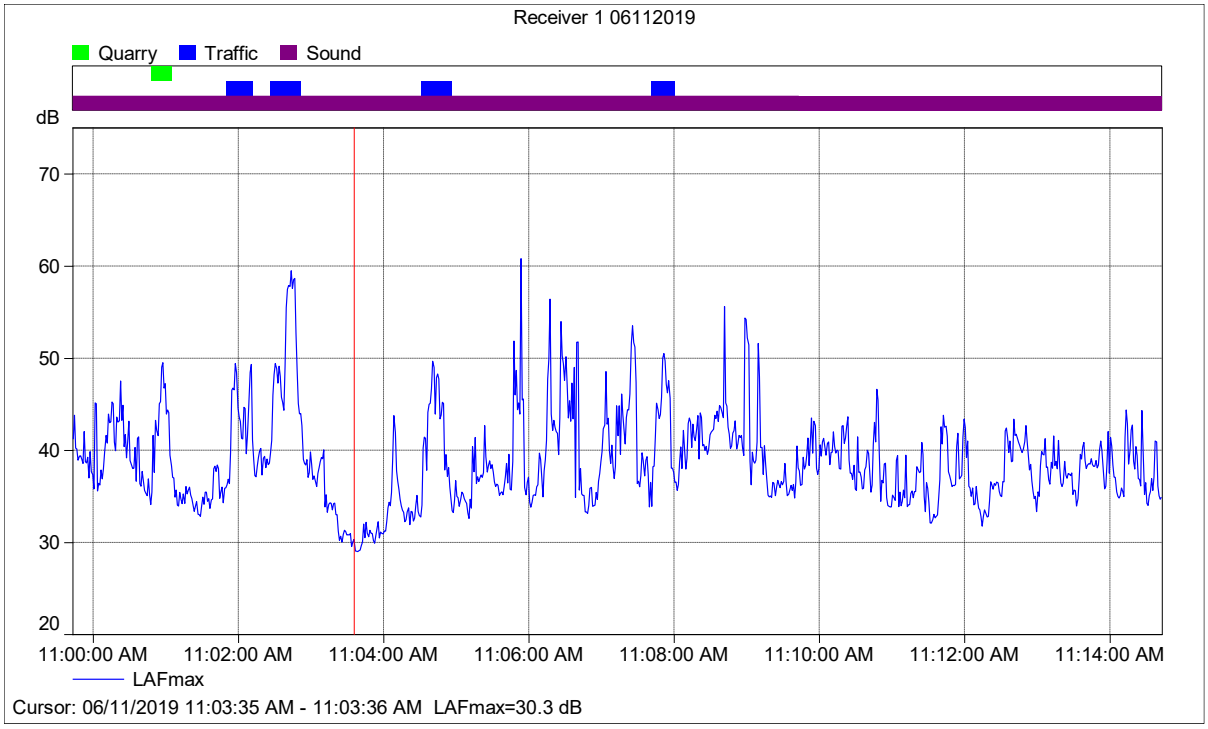
APPENDIX B
Comparison of Sound Pressure Levels



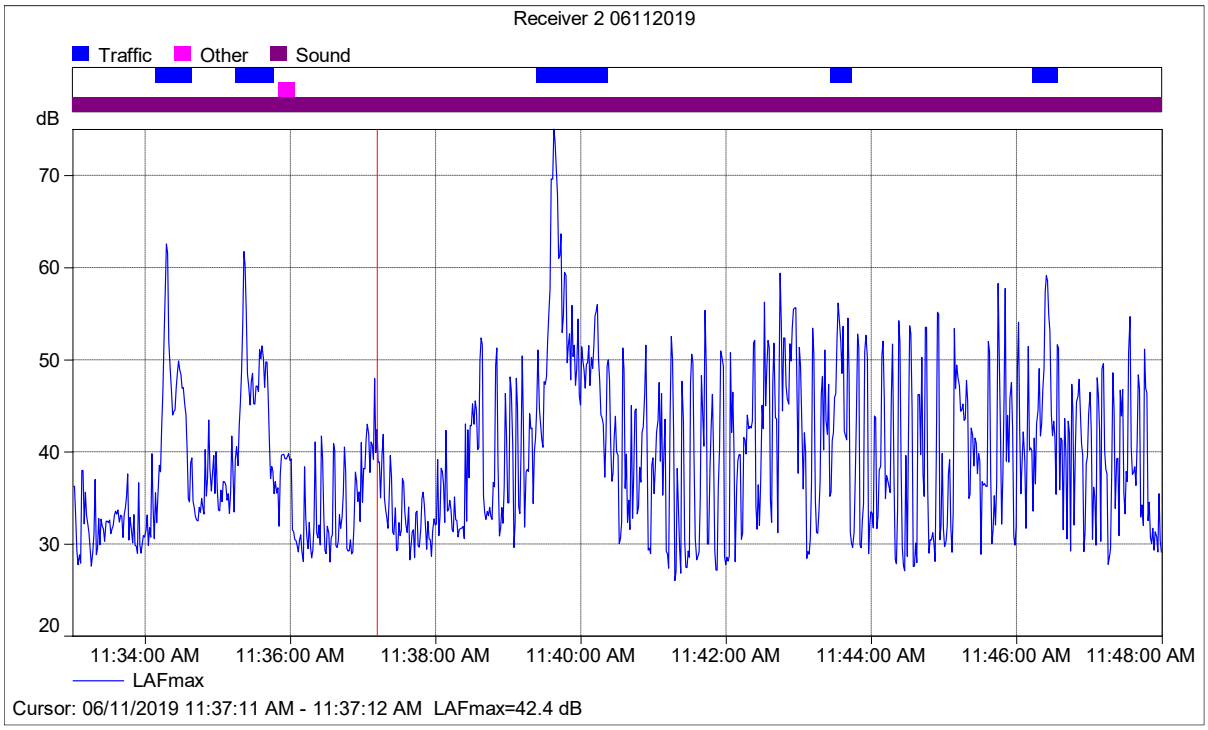
Our hearing covers a wide range of sound pressures – a ratio of over a million to one. The dB scale makes the numbers manageable.
Reproduced from
Environmental Noise Brüel and Kjær Sound & Vibration Measurements A/S 2000, 2001

APPENDIX C
Logged Levels at Receiver Locations – Graphs

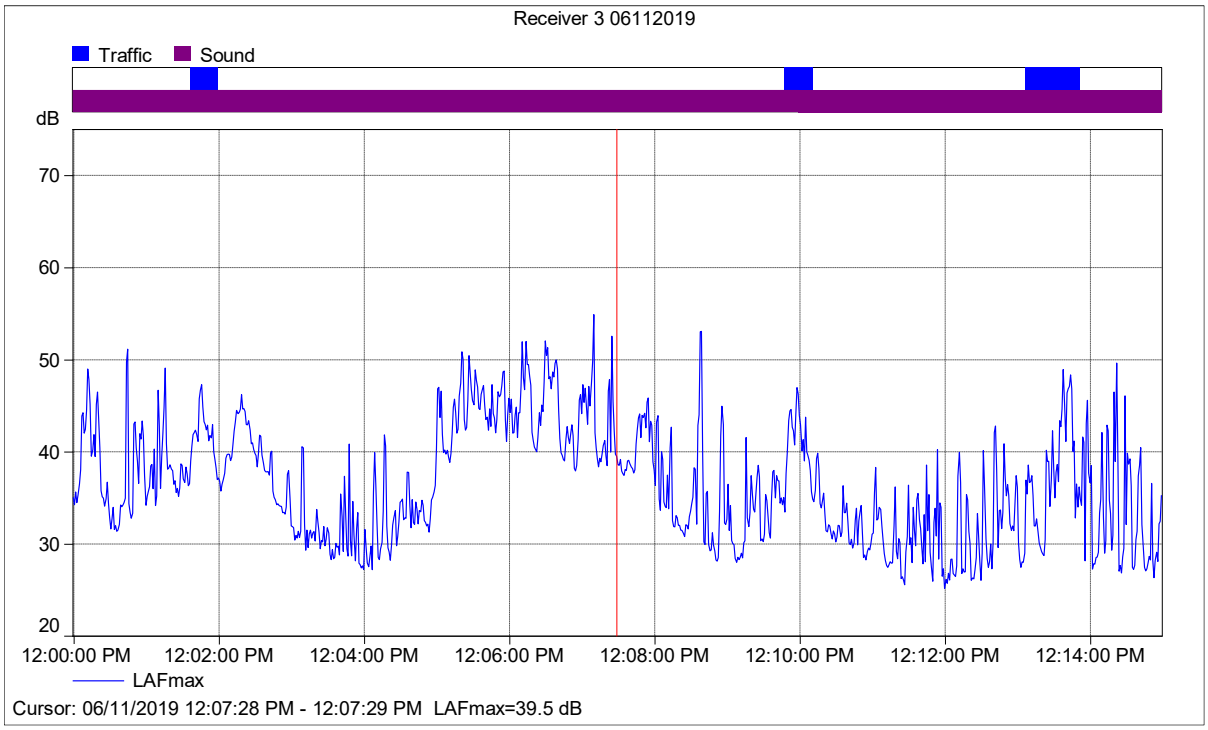
Graph C.1 Receiver 1



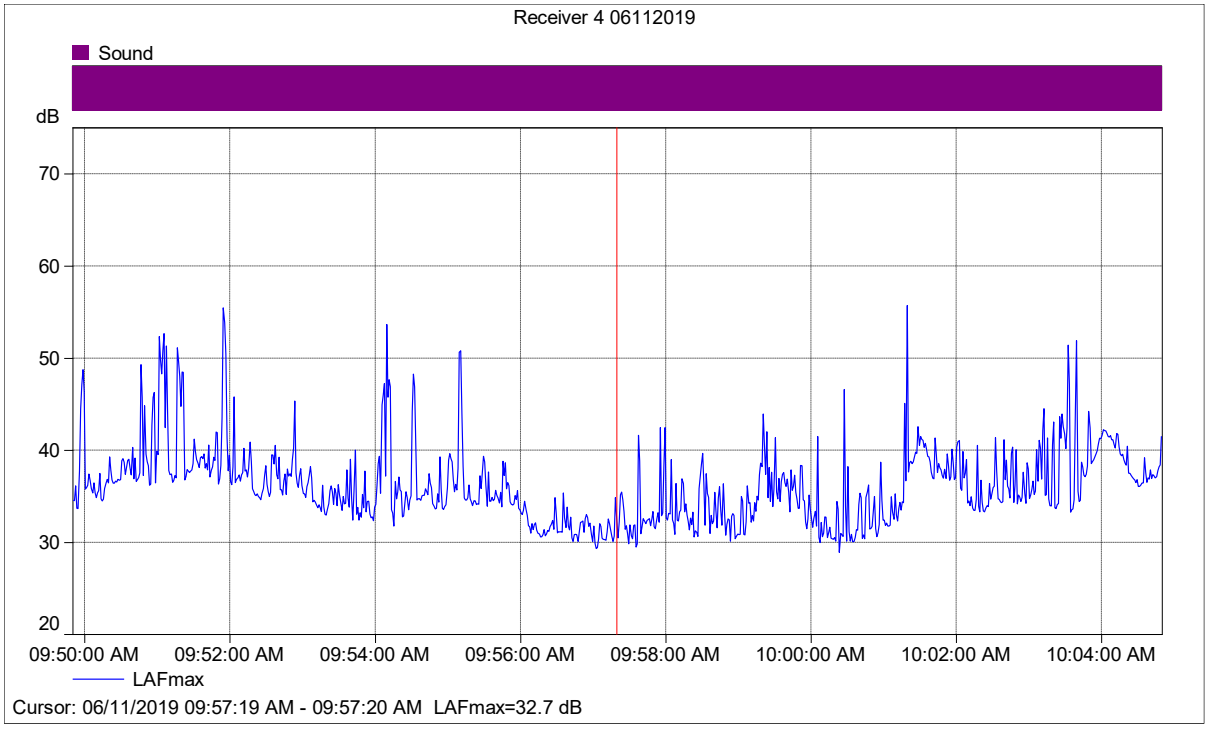
Graph C.2 Receiver 3 (Previously Receiver 2)



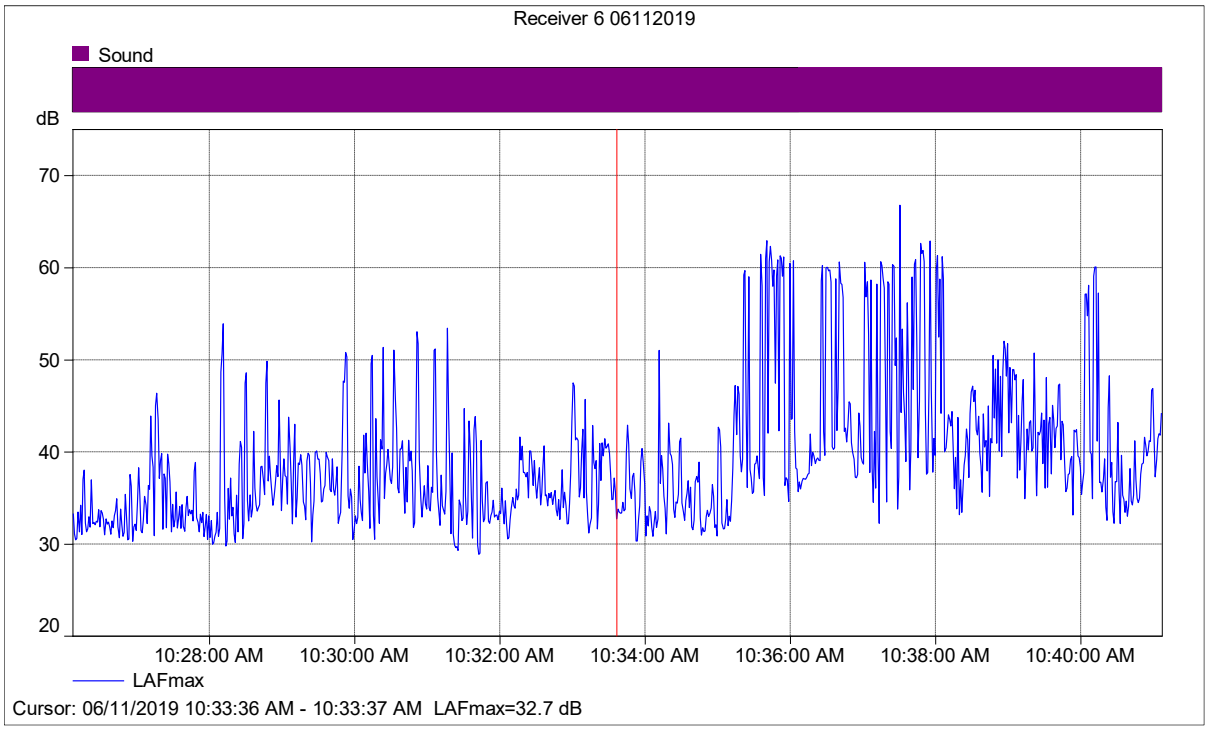
Graph C.3 Receiver 3 (Previously Receiver 2)



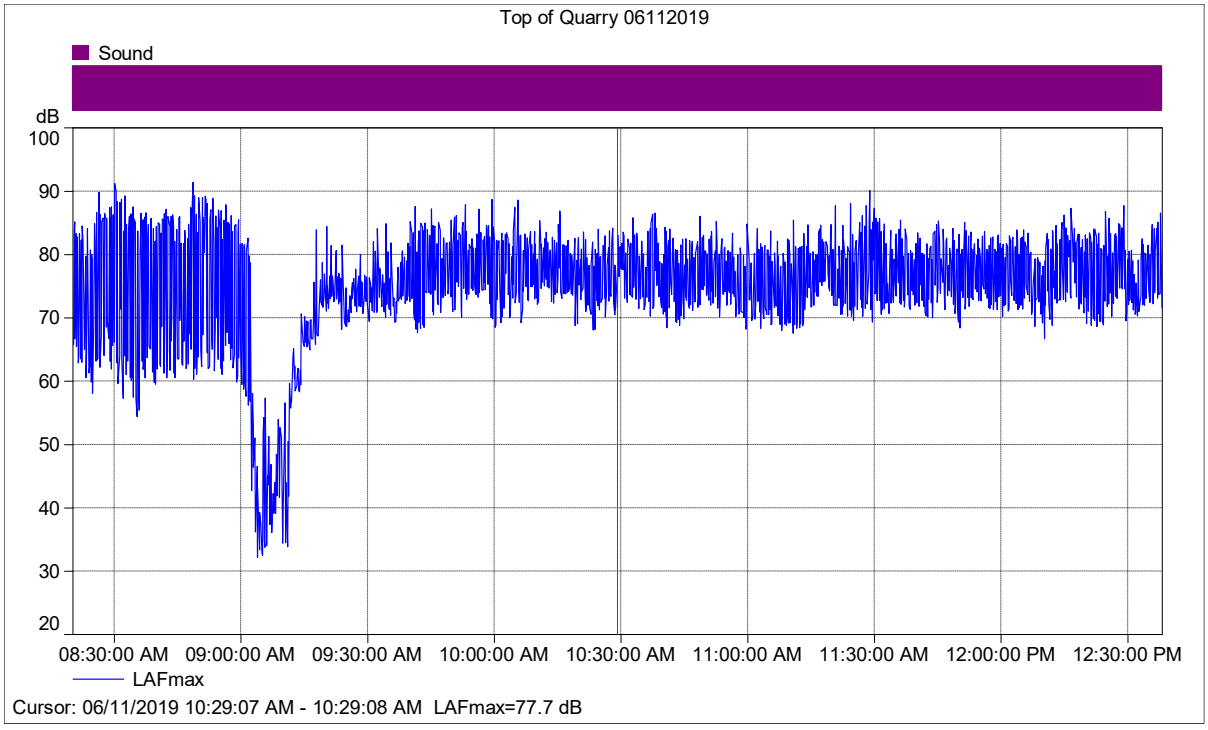
Graph C.4 Receiver 4



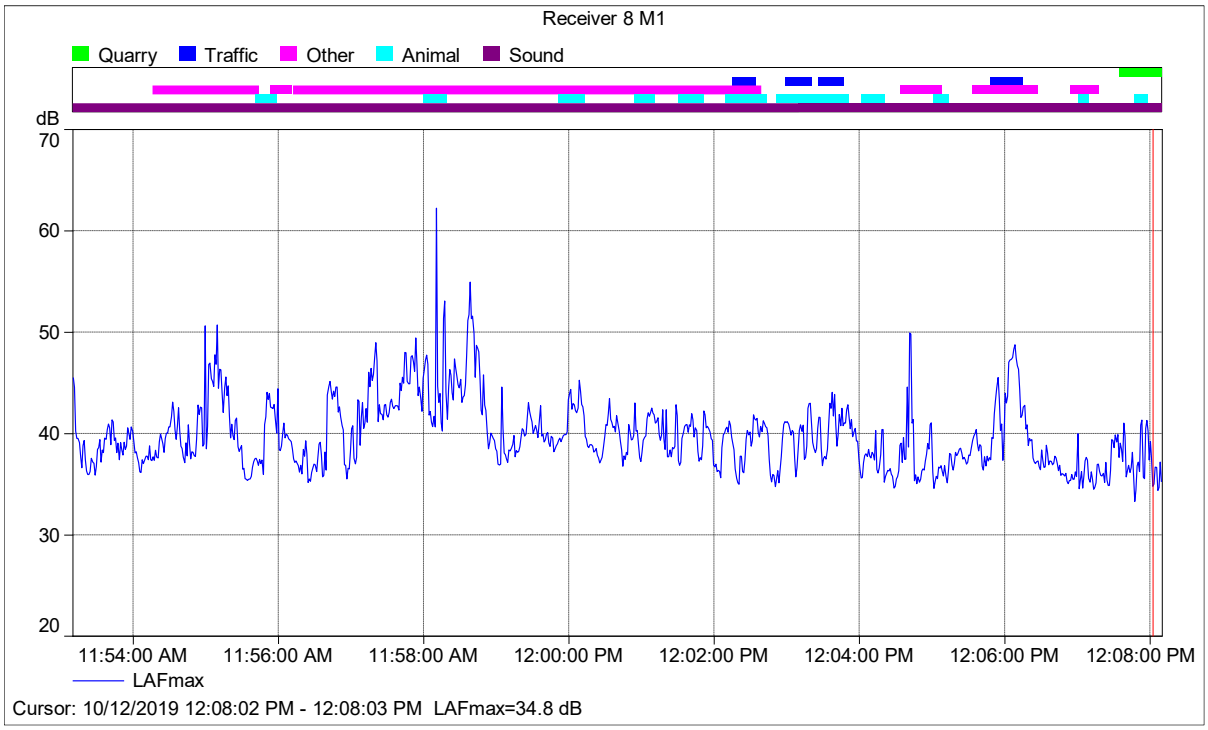
Graph C.5 Receiver 6



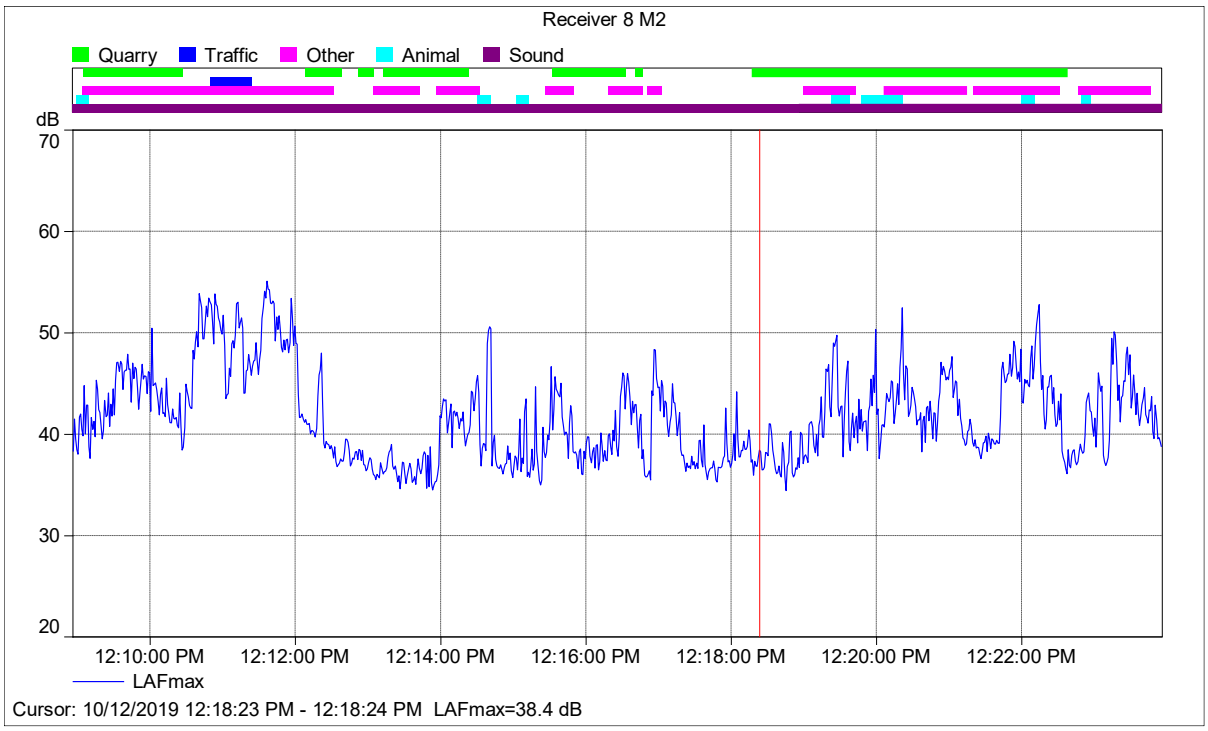
Graph C.6 Measured Noise Levels at Top of Quarry Above Crushing 6/11/2019



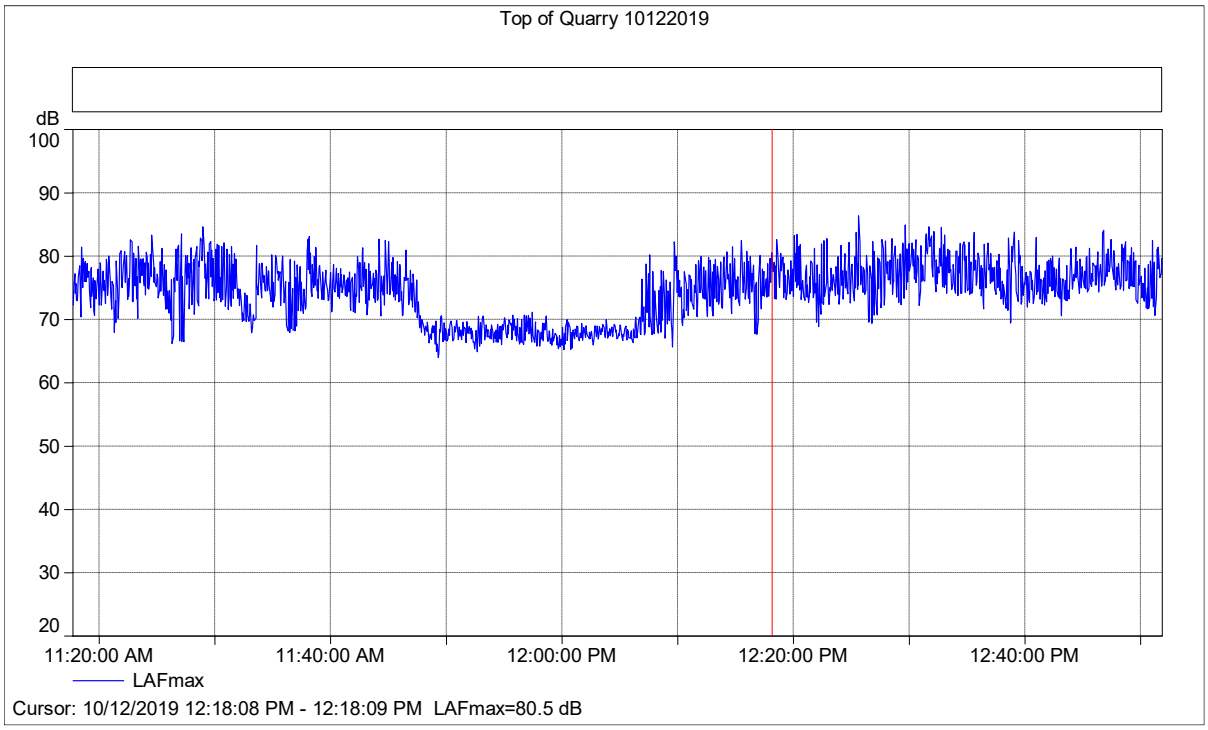
Graph C.7 Receiver 8 M1



Graph C.8 Receiver 8 M2



Graph C.9 Measured Noise Levels at Top of Quarry Above Crushing 10/12/2019



Appendix D
Quarry Operations 6th Nov & 10th Dec 2019

Source – Google Earth – Image Date 13/02/2019
Note : Aerial photo not of operations on 6th of Nov or 10th Dec 2019

Quarry Pit Floor Operations 6th November 2019

Equipment in use during noise monitoring

1 jaw crusher
1 screen deck
1 cone crusher
2 excavators
2 rock breakers
1 powered stockpiler
2 front end loaders
1 water truck
various haul trucks
various service vehicles

The mobile asphalt plant was also operating

Newton Denny Chapelle
SURVEYORS PLANNERS ENGINEERS

ATTACHMENT 8

Dust Monitoring Data 2019

Blakebrook Quarry Dust Monitoring Summary 2019

Sample Point	Exposure period	Sample comments	Sampling Days (30 days +/- 2)	Sample Volume (L)	Deposit rate of Insoluble Solids Total Suspended Solids (SSt)		Deposit rate of:			
					($g/m^2/mth$)	($mg/m^2/day$)	Ash ($g/m^2/mth$) **Limit – 4g/m²/mth**	Combustible Matter ($g/m^2/mth$)	Soluble Matter ($g/m^2/mth$)	Total Solids ($g/m^2/mth$)
1	17/12/18 - 14/01/19	org.matter/insects	28	0.14	1.2	39	0.6	0.5	0.4	1.5
	14/01/19 - 11/02/19	org/matter	28	0.41	0.9	30	0.5	0.4	0.9	1.8
	11/02/19 - 11/03/19	org/matter	28	2.65	2.5	82	1.3	1.2	5.1	7.5
	11/03/19 - 08/04/19	org/matter	28	2.91	1.3	44	0.1	1.2	2	3.3
	08/04/19 - 06/05/19	yellow org matte	28	2	0.4	14	0.2	0.2	2.5	2.9
	06/05/19 - 03/06/19	yellow org matte	28	1	0.8	28	0.1	0.7	1.2	2.1
	03/06/19 - 01/07/19	org matter	28	2.45	1.5	51	0.8	0.7	2.1	3.6
	29/07/19 - 26/08/19	org matter	28	0.15	0.6	21	0.3	0.3	0	0.6
	26/08/2019 - 24/09/19	fine org matter	29	0.2	6.9	231	6.6	0.4	0	6.9
	24/09/19 - 21/10/19	fine org matter	27	0.16	2.1	70	1.4	0.7	0.4	2.5
	21/10/19 - 18/11/19	fine org matter	28	0.2	0.5	18	0.5	0	0.1	0.6
	18/11/19 - 16/12/19	fine org matter. Cloudy brown	28	0.8	13.6	453	8.6	4.9	3.2	16.8
2	17/12/18 - 14/01/19	brown/org.matter	28	0.22	6.3	209	2.5	3.8	2.5	8.8
	14/01/19 - 11/02/19	org/matter	28	0.56	1.7	55	1.1	0.6	1.2	2.9
	11/02/19 - 11/03/19	clean	28	1.6	1.6	55	0.7	0.9	4.5	6.1
	11/03/19 - 08/04/19	yellow org matter	28	2.54	2.1	70	0.9	1.2	3.1	5.2
	08/04/19 - 06/05/19	cloudy org matter	28	1.68	1.7	57	0.5	1.2	5	6.7
	06/05/19 - 03/06/19	cloud org matter	28	0.6	1.6	53	0	1.6	1.1	2.6
	03/06/19 - 01/07/19	brown org matter	28	1.85	8.7	292	2.1	6.6	22.1	30.8
	29/07/19 - 26/08/19	org matter	28	0.06	0.5	18	0.2	0.3	0	0.5
	26/08/2019 - 24/09/19	fine org matter	29	0.2	0.5	18	0.4	0.2	0	0.5
	24/09/19 - 21/10/19	fine org matter	27	0.14	1.2	40	1	0.2	0.1	1.3
	21/10/19 - 18/11/19	fine org matter	28	0.2	0.8	26	0.5	0.3	0	0.8
	18/11/19 - 16/12/19	fine org matter. Cloudy brown	28	0.85	3.3	111	2.3	1	1.4	4.7
3	17/12/18 - 14/01/19	dry/0.2l yellowish	28	0.2	1.7	58	0.5	1.2	1.5	3.2
	14/01/19 - 11/02/19	org/matter/cloudy	28	0.5	1.6	54	0.9	0.7	1.4	3
	11/02/19 - 11/03/19	yellow/org.matter	28	1.46	4.9	164	1.3	3.6	14.7	19.7
	11/03/19 - 08/04/19	cloudy org matter	28	2.32	2.3	78	0	2.3	6.7	9.1
	08/04/19 - 06/05/19	yellow org matter	28	1.37	1.3	44	0.7	0.6	11.4	12.7
	06/05/19 - 03/06/19	org matter	28	0.51	1	33	0	1	0.6	1.6
	03/06/19 - 01/07/19	cloudy org matter	28	1.85	1.3	43	0.4	0.9	1.5	2.8
	29/07/19 - 26/08/19	yellow cloudy fine org matter	28	0.05	1.6	52	0.9	0.7	0	1.6
	26/08/2019 - 24/09/19	fine org matter	29	0.2	0.7	24	0.5	0.2	0	0.7
	24/09/19 - 21/10/19	fine org matter	27	0.02	0.8	27	0.6	0.2	0	0.8
	21/10/19 - 18/11/19	fine org matter	28	0.2	0.4	12	0.3	0	0	0.4
	18/11/19 - 16/12/19	fine org matter. Cloudy brown	28	0.85	2.8	93	2	0.8	3.3	6.1

1.15 5.075

Newton Denny Chapelle
SURVEYORS PLANNERS ENGINEERS

ATTACHMENT 9

Surface Water Monitoring Data 2019

RESULTS OF WATER ANALYSIS

3 samples supplied by Ground Water Data Collection Service on 26th March, 2019. Lab Job No.I0024

Samples submitted by [redacted]. Your Job: PO 68163 Blakebrook Surface Water

2 Tildon Drive CLUNES NSW 2480

Parameter	Methods reference	Sample 1 BQSW1	Sample 2 BQSW2	Sample 3 BQSW3
	Job No.	*I0024/1*	*I0024/2*	*I0024/3*
Total Suspended Solids (mg/L)	GFC equiv. filter - APHA 2540-D	3	7	8
Turbidity (NTU)	APHA 2130	10.8	14.6	15.1
Total Oils and Grease (mg/L)	APHA 5520-D (hexane extractable)	<2	3	8
Nitrate (mg/L N)	APHA 4500 NO_3^--F	0.024	0.073	0.061
Nitrite (mg/L N)	APHA 4500 NO_2^--I	0.021	<0.005	<0.005
Phosphate (mg/L P)	APHA 4500 P-G	0.054	0.060	0.063
Ammonia (mg/L N)	APHA 4500 NH_3-H	0.650	0.025	0.033

Notes:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
2. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
3. Analysis conducted between sample arrival date and reporting date.
4. ** NATA accreditation does not cover the performance of this service.
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[redacted]

checked: .....

[redacted]

Laboratory Manager

RESULTS OF WATER ANALYSIS

3 samples supplied by Ground Water Data Collection Service on 13th June, 2019. Lab Job No.i2771

Samples submitted by [redacted]. Your Job: Blakebrook Quarry

2 Tildon Drive CLUNES NSW 2480

Parameter	Methods reference	Sample 1 BQSW1	Sample 2 BQSW2	Sample 3 BQSW3
	Job No.	*i2771/1*	*i2771/2*	*i2771/3*
pH	APHA 4500-H^+-B	7.33	7.70	7.73
Conductivity (EC) (dS/m)	APHA 2510-B	0.863	0.221	0.201
Total Dissolved Salts (mg/L)	** Calculation using EC x 680	587	150	137
Total Suspended Solids (mg/L)	GFC equiv. filter - APHA 2540-D	4	4	60
Turbidity (NTU)	APHA 2130	3.5	8.7	35.5
Total Oils and Grease (mg/L)	APHA 5520-D (hexane extractable)	<2	3	9
Nitrate (mg/L N)	APHA 4500 NO_3^--F	<0.005	0.005	0.010
Nitrite (mg/L N)	APHA 4500 NO_2^--I	<0.005	0.005	0.005
Phosphate (mg/L P)	APHA 4500 P-G	0.016	0.028	0.032
Ammonia (mg/L N)	APHA 4500 NH_3-H	0.042	0.048	0.046

Notes:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
2. For conductivity 1 dS/m = 1 mS/cm = 1000 µS/cm.
3. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
4. Analysis conducted between sample arrival date and reporting date.
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9. Results relate only to the samples tested.
10. This report was issued on 20/06/2019.

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[redacted]

checked: .....

[redacted]

Laboratory Manager

RESULTS OF WATER ANALYSIS

3 samples supplied by Ground Water Data Collection Service on 2/09/2019 . Lab Job No.i5448

Samples submitted by [redacted]. Your Job: Blakebrook Quarry

2 Tildon Drive CLUNES NSW 2480

Parameter	Methods reference	Sample 1 BQSW1 2/9/19	Sample 2 BQSW2 2/9/19	Sample 3 BGSW3 2/9/19
	Job No.	*i5448/1*	*i5448/2*	*i5448/3*
pH	APHA 4500-H^+-B	7.13	7.58	7.52
Conductivity (EC) (dS/m)	APHA 2510-B	1.30	0.177	0.200
Total Dissolved Salts (mg/L)	** Calculation using EC x 680	882	120	136
Total Suspended Solids (mg/L)	GFC equiv. filter - APHA 2540-D	3	3	17

Notes:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
2. For conductivity 1 dS/m = 1 mS/cm = 1000 µS/cm.
3. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
4. Analysis conducted between sample arrival date and reporting date.
5. ** NATA accreditation does not cover the performance of this service.
6. .. Denotes not requested.
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9. Results relate only to the samples tested.
10. This report was issued on 09/09/2019.

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[redacted]

checked: .....
[redacted]
Laboratory Manager

RESULTS OF WATER ANALYSIS

2 samples supplied by Ground Water Data Collection Service on 5/12/2019 . Lab Job No. i8639.
Samples submitted by [redacted]. Your Job: Blakebrook Quarry
2 Tildon Drive CLUNES NSW 2480

Parameter	Methods reference	Sample 1 BQSW 2	Sample 2 BQSW
	Job No.	*i8639/1*	*i8639/2*
pH	APHA 4500-H^+-B	7.57	7.82
Conductivity (EC) (dS/m)	APHA 2510-B	0.409	0.360
Total Dissolved Salts (mg/L)	** Calculation using EC x 680	278	245
Total Suspended Solids (mg/L)	GFC equiv. filter - APHA 2540-D	15	13

Notes:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
2. For conductivity 1 dS/m = 1 mS/cm = 1000 µS/cm.
3. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
4. Analysis conducted between sample arrival date and reporting date.
5. ** NATA accreditation does not cover the performance of this service.
6. .. Denotes not requested.
7. This report is not to be reproduced except in full.
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9. Results relate only to the samples tested.
10. This report was issued on 13/12/2019.

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checked: .....
[redacted]
Laboratory Manager

Newton Denny Chapelle
SURVEYORS PLANNERS ENGINEERS

ATTACHMENT 10

Ground Water Monitoring Data 2019

Sample Point	Date	pH	Conductivity (EC) (dS/m)	Total Suspended Solids (mg/L)	Total oils & grease (mg/L)	Nitrate (mg/L/N)	Silver (mg/L)	Aluminium (mg/L)	Arsenic (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Iron (mg/L)	Manganese (mg/L)	Nickel (mg/L)	Lead (mg/L)	Selenium (mg/L)	Zinc (mg/L)	Mercury (mg/L)
ANZECC Trigger Values for Freshwater		6.5-9.0	1.5			0.7		0.055	0.024	0.0002		0.0014			0.0011	0.0034		0.008	0.0006
NHMRC Trigger Values for Drinking Water		6.5-8.5				50		0.2	0.007	0.002		2			0.02	0.01		3	0.001
GW1 BQS1-S	13/03/2019	7.08	0.502	412.9	<2	0.022	<0.010	1.771	<0.001	<0.001	0.003	0.009	7.169	0.249	0.014	0.003	<0.002	0.047	<0.0005
	13/06/2019	6.87	0.363		<2	0.028		0.271					1.208	0.18		<0.001			
	5/09/2019	6.75	0.394	180	2	0.012		0.049					4.727	0.193		0.002			
	5/12/2019	7.28	0.547	340	3	0.012		0.009					0.024	0.143		0.005			
GW2 BQS1-I	13/03/2019	8.22	1.604	317	6	0.005	<0.010	0.696	0.001	<0.001	0.001	0.004	2.34	0.123	0.003	0.002	<0.002	0.075	<0.0005
	13/06/2019	8.16	1.373		<2	0.01		0.354					0.19	0.097		0.001			
	5/09/2019	8.1	1.498	39	<2	0.019		<0.005					0.358	0.066		<0.001			
	5/12/2019	8.14	1.552	39	3	<0.005		0.005					0.009	0.045		0.001			
GW3 BQS1-D	13/03/2019	8.18	1.841	239	9	0.016	<0.010	0.518	0.001	<0.001	0.002	0.004	1.63	0.05	0.007	0.003	<0.002	0.049	<0.0005
	13/06/2019	8.22	1.608		3	0.472		1.843					8.452	0.134		0.006			
	5/09/2019	8.3	1.758	96	<2	0.051		0.011					0.005	0.024		0.003			
	5/12/2019	8.06	1.768	73	3	0.06		0.015					0.01	0.023		0.002			
GW4 BQN1-B	13/03/2019	7.17	1.157	1	9	<0.005	<0.010	0.003	0.002	<0.001	<0.001	0.003	1.91	0.156	<0.001	<0.001	<0.002	0.005	<0.0005
	13/06/2019	7.12	1.022		<2	<0.005		<0.005					1.881	0.15		<0..001			
	5/09/2019	7.08	1.104	3	<2	<0.005		<0.005					2.053	0.152		<0.001			
	5/12/2019	8.06	1.49	148	3	0.012		0.002					0.012	0.151		0.003			
GW5 BQN1-A	13/03/2019	9.57	2.023	166	9	0.143	<0.010	2.19	0.001	<0.001	0.007	0.012	2.29	0.115	0.007	0.002	<0.002	0.031	<0.0005
	13/06/2019	9.53	1.738		<2	0.133		2.661					2.822	0.116		<0.001			
	5/09/2019	9.12	1.899	107	<2	0.079		0.006					1.432	<0.001		<0.001			
	5/12/2019	8.68	1.943	92	6	0.061		0.005					0.003	0.002		0.001			
GW6 BQN1-D	13/03/2019	8.87	1.472	34	4	0.015	<0.010	0.923	0.004	<0.001	0.004	0.151	3.52	0.048	0.008	0.001	<0.002	0.05	<0.0005
	13/06/2019	8.9	1.269		3	0.037		0.581					2.182	0.04		<0.001			
	5/09/2019	8.91	1.403	52	<2	0.052		0.011					3.755	0.008		<0.001			
	5/12/2019	8.41	1.353	44	35	0.069		0.011					0.006	0.007		<0.001			
GW7 BQN2-B	13/03/2019	10.41	1.103	87	3	0.201	<0.010	0.615	0.003	<0.001	0.003	0.005	0.526	0.024	0.003	0.001	<0.002	0.025	<0.0005
	13/06/2019	11.02	1.019		<2	0.029		0.521					0.237	0.013		<0.001			
	5/09/2019	9.35	1.117	24	2	0.048		0.01					0.101	0.007		<0.001			
	5/12/2019	9.54	1.055	70	3	0.096		0.015					0.005	0.006		0.001			
GW8 BQN2-A	13/03/2019	7.98	1.11	13	5	0.072	<0.010	0.097	0.003	<0.001	0.001	0.007	0.253	0.066	0.007	0.001	<0.002	0.019	<0.0005
	13/06/2019	8	0.823		3	0.031		0.112					0.201	0.04		<0.001			
	5/09/2019	7.95	1.153	4	7	0.057		0.006					0.155	0.043		<0.001			
	5/12/2019	8.2	0.905	8	2	0.03		0.009					0.052	0.043		<0.001			
GW9 BQN2-D	13/03/2019	8.99	0.98	24	2	0.108	<0.010	0.128	0.002	<0.001	0.001	0.005	0.294	0.019	0.003	<0.001	<0.002	0.027	<0.0005
	13/06/2019	8.93	0.885		4	0.077		0.648					2.043	0.036		0.002			
	5/09/2019	8.92	0.929	26	<2	0.037		0.005					<0.005	0.004		<0.001			
	5/12/2019	8.98	0.946	308	3	0.088		0.013					0.007	0.003		0.001			

Newton Denny Chapelle
SURVEYORS PLANNERS ENGINEERS

ATTACHMENT 11

Bioregional Assessment of Water Resources 2015

Australian Government

BIOREGIONAL ASSESSMENTS

PROVIDING SCIENTIFIC WATER RESOURCE INFORMATION ASSOCIATED WITH COAL SEAM GAS AND LARGE COAL MINES

Current water accounts and water quality for the Clarence-Moreton bioregion

Product 1.5 from the Clarence-Moreton Bioregional Assessment

22 October 2015

A scientific collaboration between the Department of the Environment, Bureau of Meteorology, CSIRO and Geoscience Australia

The Bioregional Assessment Programme

The Bioregional Assessment Programme is a transparent and accessible programme of baseline assessments that increase the available science for decision making associated with coal seam gas and large coal mines. A bioregional assessment is a scientific analysis of the ecology, hydrology, geology and hydrogeology of a bioregion with explicit assessment of the potential direct, indirect and cumulative impacts of coal seam gas and large coal mining development on water resources. This Programme draws on the best available scientific information and knowledge from many sources, including government, industry and regional communities, to produce bioregional assessments that are independent, scientifically robust, and relevant and meaningful at a regional scale.

The Programme is funded by the Australian Government Department of the Environment. The Department of the Environment, Bureau of Meteorology, CSIRO and Geoscience Australia are collaborating to undertake bioregional assessments. For more information, visit http://www.bioregionalassessments.gov.au.

Department of the Environment

The Office of Water Science, within the Australian Government Department of the Environment, is strengthening the regulation of coal seam gas and large coal mining development by ensuring that future decisions are informed by substantially improved science and independent expert advice about the potential water related impacts of those developments. For more information, visit http://www.environment.gov.au/coal-seam-gas-mining/.

Bureau of Meteorology

The Bureau of Meteorology is Australia's national weather, climate and water agency. Under the *Water Act 2007*, the Bureau is responsible for compiling and disseminating Australia's water information. The Bureau is committed to increasing access to water information to support informed decision making about the management of water resources. For more information, visit http://www.bom.gov.au/water/.

CSIRO

Australia is founding its future on science and innovation. Its national science agency, CSIRO, is a powerhouse of ideas, technologies and skills for building prosperity, growth, health and sustainability. It serves governments, industries, business and communities across the nation. For more information, visit http://www.csiro.au.

Geoscience Australia

Geoscience Australia is Australia's national geoscience agency and exists to apply geoscience to Australia's most important challenges. Geoscience Australia provides geoscientific advice and information to the Australian Government to support current priorities. These include contributing to responsible resource development; cleaner and low emission energy technologies; community safety; and improving marine planning and protection. The outcome of Geoscience Australia's work is an enhanced potential for the Australian community to obtain economic, social and environmental benefits through the application of first class research and information. For more information, visit http://www.ga.gov.au.

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http://data.bioregionalassessments.gov.au/product/CLM/CLM/1.5.

Authorship is listed in relative order of contribution.

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Cover photograph

Rainforest waterfall in Border Ranges National Park, NSW, 2008

Credit: Liese Coulter, CSIRO

Australian Government
Department of the Environment
Bureau of Meteorology
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Contents

Figures

Tables

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- Technical Assurance Reference Group: Chaired by Peter Baker (Principal Science Advisor, Department of the Environment), this group comprises officials from the NSW, Queensland, South Australian and Victorian governments.

Introduction

The Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC) was established to provide advice to the federal Minister for the Environment on potential water-related impacts of coal seam gas (CSG) and large coal mining developments.

Bioregional assessments (BAs) are one of the key mechanisms to assist the IESC in developing this advice so that it is based on best available science and independent expert knowledge. Importantly, technical products from BAs are also expected to be made available to the public, providing the opportunity for all other interested parties, including government regulators, industry, community and the general public, to draw from a single set of accessible information. A BA is a scientific analysis, providing a baseline level of information on the ecology, hydrology, geology and hydrogeology of a bioregion with explicit assessment of the potential direct, indirect and cumulative impacts of CSG and coal mining development on water resources.

The IESC has been involved in the development of *Methodology for bioregional assessments of the impacts of coal seam gas and coal mining development on water resources* (the BA methodology; Barrett et al., 2013) and has endorsed it. The BA methodology specifies how BAs should be undertaken. Broadly, a BA comprises five components of activity, as illustrated in Figure 1. Each BA will be different, due in part to regional differences, but also in response to the availability of data, information and fit-for-purpose models. Where differences occur, these are recorded, judgments exercised on what can be achieved, and an explicit record is made of the confidence in the scientific advice produced from the BA.

The Bioregional Assessment Programme

The Bioregional Assessment Programme is a collaboration between the Department of the Environment, the Bureau of Meteorology, CSIRO and Geoscience Australia. Other technical expertise, such as from state governments or universities, is also drawn on as required. For example, natural resource management groups and catchment management authorities identify assets that the community values by providing the list of water-dependent assets, a key input.

The Technical Programme, part of the Bioregional Assessment Programme, will undertake BAs for the following bioregions and subregions:

- the Galilee, Cooper, Pedirka and Arckaringa subregions, within the Lake Eyre Basin bioregion
- the Maranoa-Balonne-Condamine, Gwydir, Namoi and Central West subregions, within the Northern Inland Catchments bioregion
- the Clarence-Moreton bioregion
- the Hunter and Gloucester subregions, within the Northern Sydney Basin bioregion
- the Sydney Basin bioregion
- the Gippsland Basin bioregion.

Technical products (described in a later section) will progressively be delivered throughout the Programme.

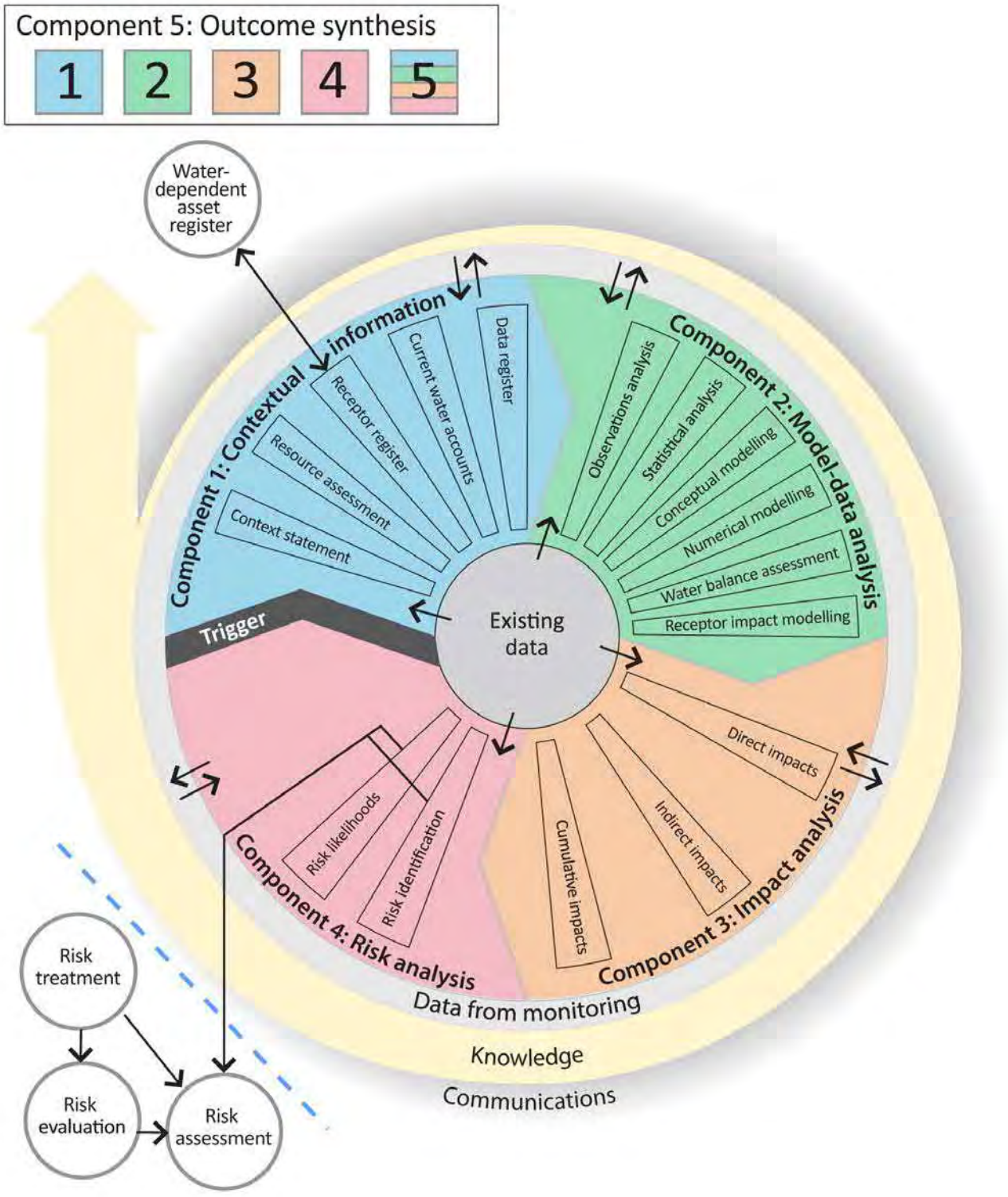

Figure 1 Schematic diagram of the bioregional assessment methodology

The methodology comprises five components, each delivering information into the bioregional assessment and building on prior components, thereby contributing to the accumulation of scientific knowledge. The small grey circles indicate activities external to the bioregional assessment. Risk identification and risk likelihoods are conducted within a bioregional assessment (as part of Component 4) and may contribute activities undertaken externally, such as risk evaluation, risk assessment and risk treatment. Source: Figure 1 in Barrett et al. (2013), © Commonwealth of Australia

Methodologies

For transparency and to ensure consistency across all BAs, submethodologies have been developed to supplement the key approaches outlined in the *Methodology for bioregional assessments of the impact of coal seam gas and coal mining development on water resources* (Barrett et al., 2013). This series of submethodologies aligns with technical products as presented in Table 1. The submethodologies are not intended to be 'recipe books' nor to provide step-by-step instructions; rather they provide an overview of the approach to be taken. In some instances, methods applied for a particular BA may need to differ from what is proposed in the submethodologies – in this case an explanation will be supplied. Overall, the submethodologies are intended to provide a rigorously defined foundation describing how BAs are undertaken.

Table 1 Methodologies and associated technical products listed in Table 2

Code	Proposed title	Summary of content	Associated technical product
M01	*Methodology for bioregional assessments of the impacts of coal seam gas and coal mining development on water resources*	A high-level description of the scientific and intellectual basis for a consistent approach to all bioregional assessments	All
M02	*Compiling water-dependent assets*	Describes the approach for determining water-dependent assets	1.3 Description of the water-dependent asset register
M03	*Assigning receptors and impact variables to water-dependent assets*	Describes the approach for determining receptors associated with water-dependent assets	1.4 Description of the receptor register
M04	*Developing a coal resource development pathway*	Specifies the information that needs to be collected and reported in product 1.2 (i.e. known coal and coal seam gas resources as well as current and potential resource developments). Describes the process for determining the coal resource development pathway (reported in product 2.3)	1.2 Coal and coal seam gas resource assessment 2.3 Conceptual modelling
M05	*Developing the conceptual model for causal pathways*	Describes the development of the conceptual model for causal pathways, which summarises how the 'system' operates and articulates the links between coal resource developments and impacts on receptors	2.3 Conceptual modelling
M06	*Surface water modelling*	Describes the approach taken for surface water modelling across all of the bioregions and subregions. It covers the model(s) used, as well as whether modelling will be quantitative or qualitative.	2.6.1 Surface water numerical modelling
M07	*Groundwater modelling*	Describes the approach taken for groundwater modelling across all of the bioregions and subregions. It covers the model(s) used, as well as whether modelling will be quantitative or qualitative. It also considers surface water – groundwater interactions, as well as how the groundwater modelling is constrained by geology.	2.6.2 Groundwater numerical modelling

Code	Proposed title	Summary of content	Associated technical product
M08	*Receptor impact modelling*	Describes how to develop the receptor impact models that are required to assess the potential impacts from coal seam gas and large coal mining on receptors. Conceptual, semi-quantitative and quantitative numerical models are described.	2.7 Receptor impact modelling
M09	*Propagating uncertainty through models*	Describes the approach to sensitivity analysis and quantifying uncertainty in the modelled hydrological response to coal and coal seam gas development	2.3 Conceptual modelling 2.6.1 Surface water numerical modelling 2.6.2 Groundwater numerical modelling 2.7 Receptor impact modelling
M10	*Risk and cumulative impacts on receptors*	Describes the process to identify and analyse risk	3 Impact analysis 4 Risk analysis
M11	*Hazard identification*	Describes the process to identify potential water-related hazards from coal and coal seam gas development	2 Model-data analysis 3 Impact analysis 4 Risk analysis
M12	*Fracture propagation and chemical concentrations*	Describes the likely extent of both vertical and horizontal fractures due to hydraulic stimulation and the likely concentration of chemicals after production of coal seam gas	2 Model-data analysis 3 Impact analysis 4 Risk analysis

Each submethodology is available online at http://www.bioregionalassessments.gov.au. Submethodologies might be added in the future.

Technical products

The outputs of the BAs include a suite of technical products variously presenting information about the ecology, hydrology, hydrogeology and geology of a bioregion and the potential direct, indirect and cumulative impacts of CSG and coal mining developments on water resources, both above and below ground. Importantly, these technical products are available to the public, providing the opportunity for all interested parties, including community, industry and government regulators, to draw from a single set of accessible information when considering CSG and large coal mining developments in a particular area.

The information included in the technical products is specified in the BA methodology. Figure 2 shows the information flow within a BA. Table 2 lists the content provided in the technical products, with cross-references to the part of the BA methodology that specifies it. The red rectangles in both Figure 2 and Table 2 indicate the information included in this technical product.

This technical product is delivered as a report (PDF). Additional material is also provided, as specified by the BA methodology:

- all unencumbered data syntheses and databases
- unencumbered tools, model code, procedures, routines and algorithms
- unencumbered forcing, boundary condition, parameter and initial condition datasets
- the workflow, comprising a record of all decision points along the pathway towards completion of the BA, gaps in data and modelling capability, and provenance of data.

The PDF of this technical product, and the additional material, are available online at http://www.bioregionalassessments.gov.au.

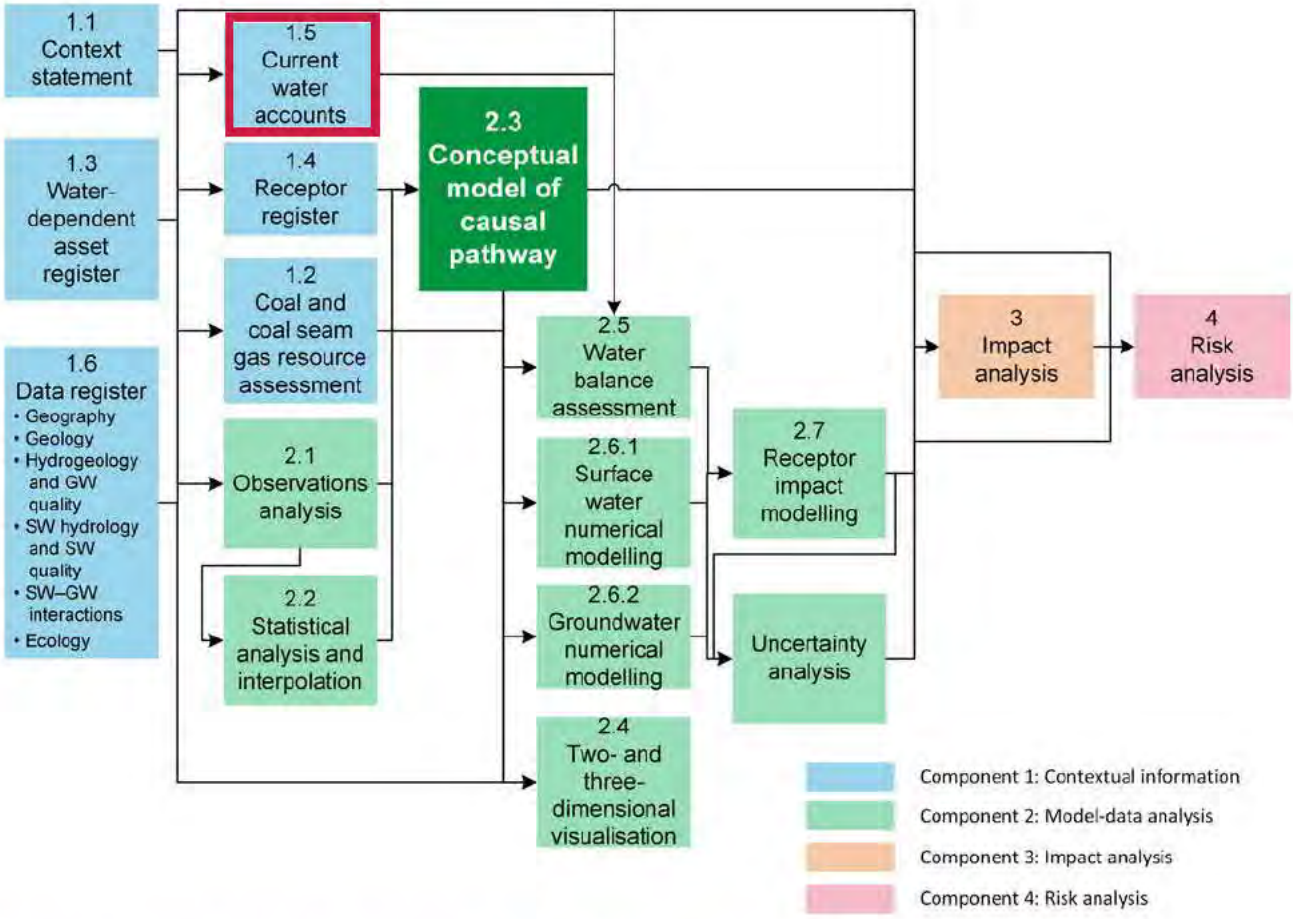

Figure 2 The simple decision tree indicates the flow of information through a bioregional assessment

The red rectangle indicates the information included in this technical product.

Table 2 Technical products delivered by the Clarence-Moreton Bioregional Assessment

For each subregion in the Clarence-Moreton Bioregional Assessment, technical products are delivered online at http://www.bioregionalassessments.gov.au, as indicated in the 'Type' column[a]. Other products – such as datasets, metadata, data visualisation and factsheets – are provided online.

Component	Product code	Title	Section in the BA methodology[b]	Type[a]
Component 1: Contextual information for the Clarence-Moreton bioregion	1.1	Context statement	2.5.1.1, 3.2	PDF, HTML
	1.2	Coal and coal seam gas resource assessment	2.5.1.2, 3.3	PDF, HTML
	1.3	Description of the water-dependent asset register	2.5.1.3, 3.4	PDF, HTML, register
	1.4	Description of the receptor register	2.5.1.4, 3.5	PDF, HTML, register
	1.5	Current water accounts and water quality	2.5.1.5	PDF, HTML
	1.6	Data register	2.5.1.6	Register
Component 2: Model-data analysis for the Clarence-Moreton bioregion	2.1-2.2	Observations analysis, statistical analysis and interpolation	2.5.2.1, 2.5.2.2	PDF, HTML
	2.3	Conceptual modelling	2.5.2.3, 4.3	PDF, HTML
	2.5	Water balance assessment	2.5.2.4	PDF, HTML
	2.6.1	Surface water numerical modelling	4.4	PDF, HTML
	2.6.2	Groundwater numerical modelling	4.4	PDF, HTML
	2.7	Receptor impact modelling	2.5.2.6, 4.5	Not produced
Component 3: Impact analysis for the Clarence-Moreton bioregion	3-4	Impact analysis	5.2.1	PDF, HTML
Component 4: Risk analysis for the Clarence-Moreton bioregion		Risk analysis	2.5.4, 5.3	
Component 5: Outcome synthesis for the Clarence-Moreton bioregion	5	Outcome synthesis	2.5.5	PDF, HTML

[a]The types of products are as follows:

- 'PDF' indicates a PDF document that is developed by the Clarence-Moreton Bioregional Assessment using the structure, standards, and look and feel specified by the programme.
- 'HTML' indicates the same content as in the PDF document, but delivered as webpages.
- 'Register' indicates controlled lists that are delivered using a variety of formats as appropriate.
- 'Not produced' indicates that the product was not developed. A webpage explains why and points to relevant submethodologies (Table 1).

About this technical product

The following notes are relevant only for this technical product.

- All reasonable efforts were made to provide all material under a Creative Commons Attribution 3.0 Australia Licence.
- All maps created as part of this BA for inclusion in this product used the Albers equal area projection with a central meridian of 151.0° East for the Clarence-Moreton bioregion and two standard parallels of –18.0° and –36.0°.
- Contact bioregionalassessments@bom.gov.au to access metadata (including copyright, attribution and licensing information) for all datasets cited or used to make figures in this product. At a later date, this information, as well as all unencumbered datasets, will be published online.
- The citation details of datasets are correct to the best of the knowledge of the Bioregional Assessment Programme at the publication date of this product. Readers should use the hyperlinks provided to access the most up-to-date information about these data; where there are discrepancies, the information provided online should be considered correct. The dates used to identify Bioregional Assessment Source Datasets are the dataset's created date. Where a created date is not available, the publication date or last updated date is used.

References

Barrett DJ, Couch CA, Metcalfe DJ, Lytton L, Adhikary DP and Schmidt RK (2013) Methodology for bioregional assessments of the impacts of coal seam gas and coal mining development on water resources. A report prepared for the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development through the Department of the Environment. Department of the Environment, Australia. Viewed 20 November 2015, http://www.iesc.environment.gov.au/publications/methodology-bioregional-assessments-impacts-coal-seam-gas-and-coal-mining-development-water.

1.5 Current water accounts and water quality for the Clarence-Moreton bioregion

This product provides current water account and water quality information that will be used in subsequent products in the bioregional assessment.

The water accounts include information about water stores, flows, allocations and use that will be required in the water balance (product 2.5) and in the numerical modelling (product 2.6.1 and product 2.6.2).

This product also provides information about surface water and groundwater quality that will be required for the impact and risk analysis (product 3-4).

1.5.1 Current water accounts

Summary

Current coal and coal seam gas (CSG) development and exploration, which may impact water resources are primarily located in an area to the west of the town of Casino in the Richmond river basin. The surface water accounts were only determined for the Richmond river basin as this is the area being modelled. The Richmond river basin includes the Richmond and Wilsons rivers with small contributions from Eden Creek and Shannon Brook. There are two main reservoirs (Toonumbar and Rocky Lake) and a few small dams and weirs that supply water to agricultural, domestic and municipal users. The combined storage volume in the main reservoirs is 25 GL. The main surface water resource of the Richmond river basin is the Richmond River. In the Richmond river basin, permits to extract surface water amount to 99.8 GL/year.

The groundwater accounts were also restricted to the model domain of the numerical groundwater model, whose boundaries were constrained by knowledge of the geology, previous studies in the Clarence-Moreton Basin and Surat Basin, and common modeling practise. The analysis lacks measurement of actual groundwater usage, hence, it was estimated using the allocation data in the NSW state groundwater database (Bioregional Assessment Programme, Dataset 2 in Section 1.5.1.2). Those estimates indicated that 88.1% of the bores have allocations of less than or equal to 5 ML/year. Of the estimated water usage, 49.5% and 42% is allocated for irrigation and domestic/stock bores, respectively. The Richmond River alluvium and Lamington Volcanics represent the two main groundwater supply aquifers with much smaller allocations in the Grafton Formation and the Walloon Coal Measures. The NSW water sharing plans are developed to preserve surface water and groundwater by balancing the competing demands of different types of water usages. They are defined based on surface river basins and groundwater systems.

1.5.1.1 Surface water

The modelling boundary (as defined in companion products 2.6.1 and 2.6.2 for the Clarence-Moreton bioregion) is smaller than the preliminary assessment extent (PAE) since the coal resource development pathway is confined to an area within the Richmond river basin. The surface water modelling area is therefore restricted to within the Richmond river basin, for which the water accounts are being reported.

The Richmond River, located in far-north NSW, drains an area of 7020 km^2 from its headwaters in the Border Ranges and the Richmond Range. Further details on the Richmond river basin, including its location in the Clarence-Moreton bioregion, are given in companion product 1.1 for the Clarence-Moreton bioregion (Rassam et al., 2014). Current coal and CSG development and exploration, which may impact water resources are primarily located in the western part of the subregion (west of Casino). Figure 3 shows a detailed stream network, storages, irrigated land and historical coal mines in the Richmond river basin. There is a single mapped mineral deposit just outside the Richmond river basin, which is the Tabulam iron ore deposit (Figure 3). The major

tributaries to the Richmond River upstream of Casino include Iron Pot and Eden creeks (Figure 3). The major tributaries to the Richmond River downstream of Casino include Wilsons River and Coopers, Terania, Leycester, Sandy and Bungawalbin creeks and Shannon Brook. There are numerous other minor tributaries.

Water storages in the basin include Toonumbar Dam (capacity 11 GL excluding flood storage), which stores water for hydro-power, irrigation, stock and town water; and Rocky Lake (capacity 14 GL excluding flood storage), which provides water for the towns of Lismore and Ballina. There are four weir structures on the Richmond River near Casino and one on the Wilsons River that provides water to Mullumbimby in the Brunswick river basin. Irrigated pastures are found around the alluvial flats of the Richmond and Wilson rivers and groundwater is used to irrigate fruit and nut crops on the Alstonville Plateau. With only two main water storages and a few weirs, most of the flows in the Richmond river basin are largely unregulated.

The remainder of this product describes:

- water volumes held in surface water storages
- surface water permits and allocations
- data gaps.

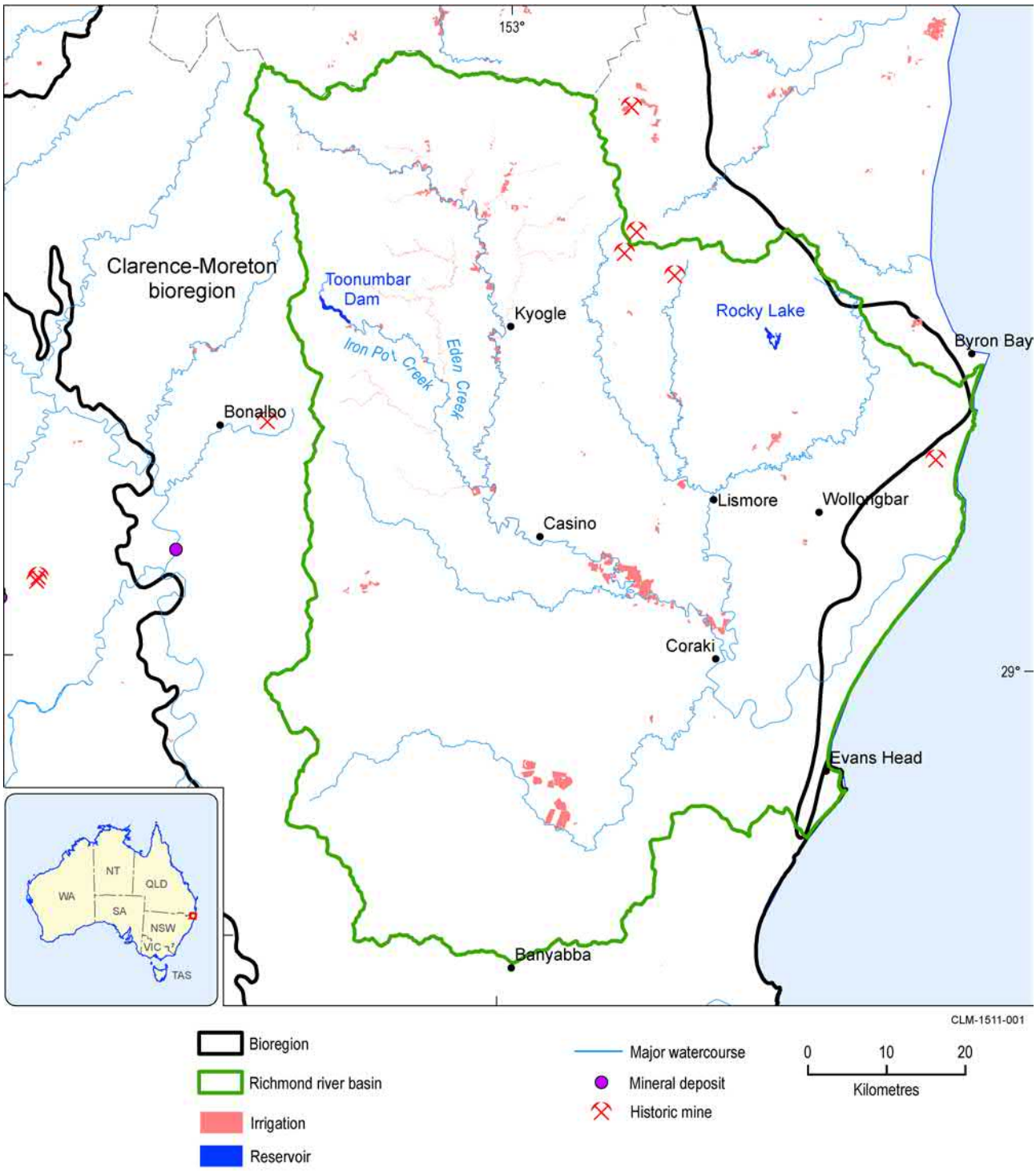

Figure 3 Tributaries of the Richmond River, town centres, irrigation areas and historical coal mines

Data: Streamflow gauge locations obtained from NSW Office of Water (2015). Coal mine and resource data sourced from the OZMIN database (Geoscience Australia, 2013), information current as of December 2012

1.5.1.1.1 Water accounts in the Richmond river basin

With only two main water storages (Toonumbar Dam and Rocky Lake) and a few weirs, flows in the Richmond River are largely unregulated. Storage volumes are summarised in Table 3 and Table 4. The mean daily volume (2004–05 to 2011–12) was 10.59 GL (range 7.29 to 14.05 GL) in Toonumbar Dam. The mean daily volume (2008–09 to 2011–12) was 13.85 GL (range 9.11 to 15.52 GL) in Rocky Lake. The combined mean daily storage was 24.44 GL.

Inflows to the Toonumbar Dam are ungauged but flows are measured below the dam at Iron Pot Creek at Toonumbar (203023). Losses from the Toonumbar Dam storage occur through continual controlled stream releases to supply downstream irrigation and flood releases when storage capacity is exceeded. Mean flows at Iron Pot Creek at Toonumbar were 36.9 GL/year (range 4.1–83.5 GL/year). Other sources of outflow such as evapotranspiration from the reservoir surface also account for losses from the storage.

Table 3 Storage volumes at the start (July) of the water year, inflows and outflows for Toonumbar Dam (11 GL capacity excluding flood storage) in the Richmond river basin

	Volume (GL) (July 1)	Minimum volume (GL)	Maximum volume (GL)	Outflow (GL/y)
2004–05	11.01	7.81	11.01	5.1
2005–06	9.15	7.29	11.70	16.8
2006–07	11.01	9.28	11.12	4.1
2007–08	9.30	8.45	14.05	65.0
2008–09	11.13	10.95	12.52	42.6
2009–10	11.23	10.22	11.85	19.6
2010–11	11.13	10.87	12.73	83.5
2011–12	11.22	11.00	12.18	58.2

Data: Outflow volumes for Toonumbar Dam were obtained from NSW Office of Water (2015). Volumes were obtained from the Bureau of Meteorology (Dataset 1)

Table 4 Storage volumes at the start (July) of the water year for Rocky Lake (14 GL capacity excluding flood storage) in the Richmond river basin

	Volume (GL) (July 1)	Minimum volume (GL)	Maximum volume (GL)
2004–05	NA	NA	NA
2005–06	NA	NA	NA
2006–07	NA	NA	NA
2007–08	NA	NA	NA
2008–09	14.01	9.11	15.52
2009–10	14.08	11.39	14.56
2010–11	14.01	13.20	15.22
2011–12	14.11	13.61	15.21

NA = data not available
Data: Volumes were obtained from the Bureau of Meteorology (Dataset 1)

Surface water licences and entitlements

In the Richmond river basin, licences amount to 99,881 ML/year. Table 5 summarises surface water licences by purpose and Table 6 by type and water source (definitions of some terms are

given in Table 8 of Section 1.5.1.2). Figure 4 shows the geographic distribution and extraction volumes for each licence.

Table 5 Licences grouped by purpose in the Richmond river basin

Purpose	Number of licences	Volume (ML/y)
Town Water Supply	8	6,397
Town Water Supply, Stock	4	2,620
Town Water Supply, Stock, Industrial, Domestic	6	12,358
Town Water Supply, Industrial	4	544
Town Water Supply, Domestic	2	120
Recreation - Low Security	4	100
Stock	5	15
Stock, Industrial, Irrigation	3	573
Stock, Irrigation	14	729
Stock, Irrigation, Domestic	62	745
Stock, Domestic	31	123
Stock, Domestic, Irrigation	10	101
Stock, Domestic, Farming, Irrigation	6	190
Stock, Farming	2	8
Commercial	2	4
Industrial	6	226
Industrial, Stock, Domestic	2	10
Industrial, Irrigation	14	2,547
Industrial - Sand & Gravel	1	37
Irrigation	1199	56,974
Irrigation, Recreation - Low Security	1	41
Irrigation, Stock	2	18
Irrigation, Stock, Domestic	6	141
Irrigation, Industrial	2	795
Irrigation, Industrial (Low Security)	2	66
Irrigation, Domestic	58	653
Irrigation, Farming	129	9,384
Domestic	82	198
Domestic, Stock	4	16
Domestic, Stock, Irrigation	6	45
Domestic, Irrigation	18	158

Purpose	Number of licences	Volume (ML/y)
Domestic, Irrigation, Stock	5	152
Farming	32	152
Farming, Stock, Domestic	2	9
Farming, Irrigation	39	2,723
Farming, Irrigation, Industrial	6	204
Farming, Domestic	10	17
Aquaculture	2	30
Aquaculture, Irrigation	2	168
Conservation of Water, Irrigation	7	345
Experimenal/Research	1	145
TOTAL	1801	99,881

Data: NSW Office of Water (Dataset 2)

Table 6 Licences grouped by river or creek in the Richmond river basin

Asset type	Water source	Number of licences	Volume (ML/y)
Basic Right	Alstonville Area	26	77
Basic Right	Bangalow Area	26	40
Basic Right	Coopers Creek	12	18
Basic Right	Coraki Area	4	9
Basic Right	Eden Creek	1	4
Basic Right	Evans River	1	1
Basic Right	Gradys Creek	3	6
Basic Right	Kyogle Area	5	50
Basic Right	Leycester Creek	5	67
Basic Right	Myall Creek	1	1
Basic Right	Richmond Regulated	4	6
Basic Right	Shannon Brook	4	15
Basic Right	Terania Creek	9	17
Basic Right	Tuckean Area	16	28
Basic Right	Upper Richmond River	4	9
Basic Right	Wyrallah Area	1	4
Water Access Right	Alstonville Area	182	7,474
Water Access Right	Bangalow Area	257	5,927
Water Access Right	Broadwater Area	3	360

Asset type	Water source	Number of licences	Volume (ML/y)
Water Access Right	Coopers Creek	169	5,708
Water Access Right	Coraki Area	203	17,917
Water Access Right	Doubtful Creek	12	185
Water Access Right	Eden Creek	18	524
Water Access Right	Gradys Creek	50	2,340
Water Access Right	Kyogle Area	163	10,265
Water Access Right	Lennox Area	2	42
Water Access Right	Leycester Creek	56	964
Water Access Right	Myall Creek	9	1,419
Water Access Right	Richmond Regulated	80	10,258
Water Access Right	Sandy Creek	6	342
Water Access Right	Shannon Brook	23	436
Water Access Right	Terania Creek	122	14,808
Water Access Right	Tuckean Area	164	4,961
Water Access Right	Upper Richmond River	55	2,232
Water Access Right	Wyrallah Area	105	13,367
	TOTAL	1801	99,881

Water access right refers to the right conferred by law to hold or take water from a water resource.
Data: NSW Office of Water (Dataset 2)

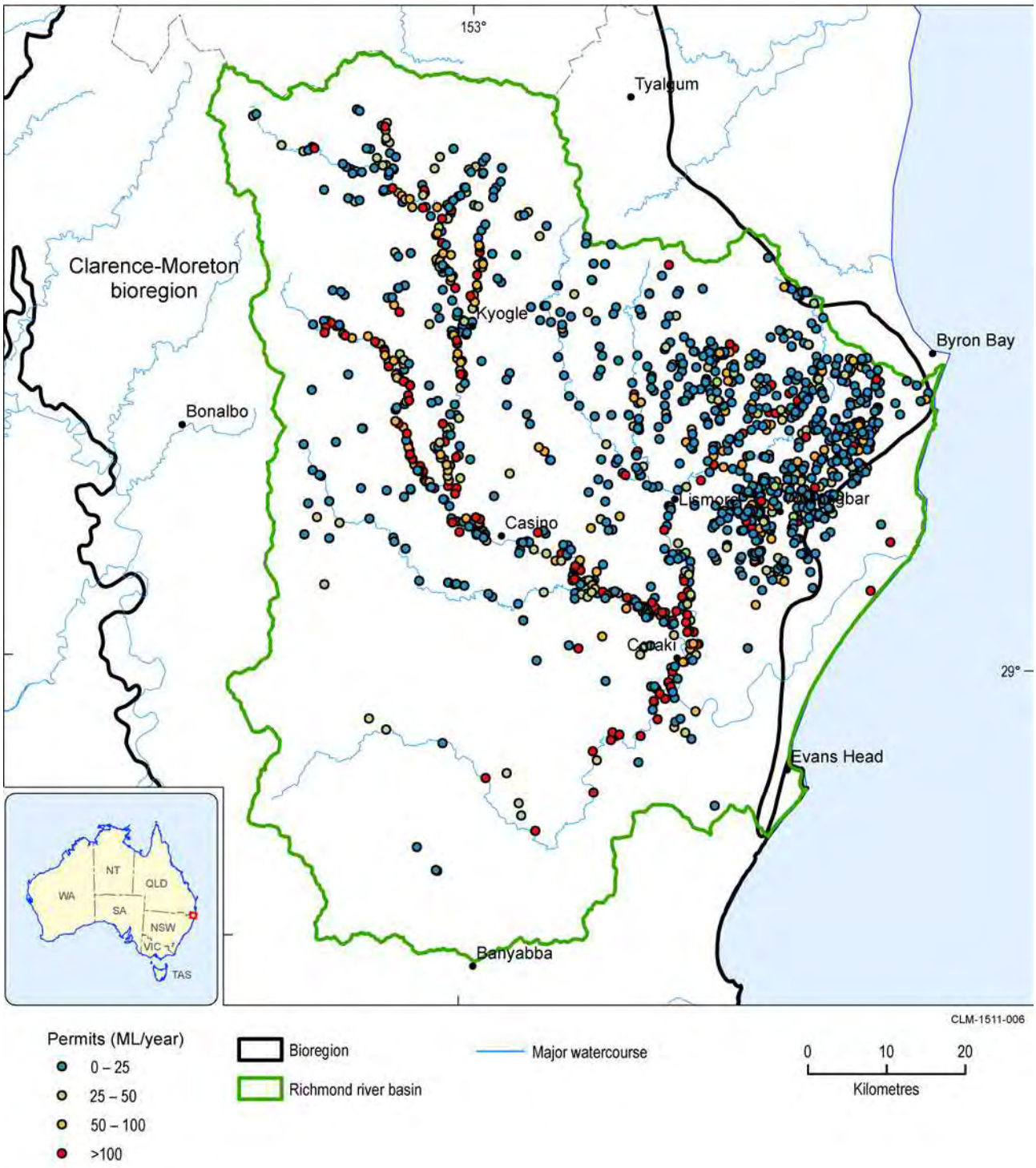

Figure 4 Location of surface water licences in the Richmond river basin (the colour scale indicates the amount of allocated water)

Data: NSW Office of Water (Dataset 2)

1.5.1.1.2 Gaps

There are several unknown water sources and volumes including:

- ungauged tributary inflow
- ungauged runoff
- surface water – groundwater interactions.

Some of the sources not included here are implicitly considered, for example, reservoir rainfall and evaporation would be reflected in changes in the storage volume.

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1.5.1.2 Groundwater

Analyses of the groundwater accounts were restricted to the area for which a groundwater model will be constructed. The model domain extent and its boundaries were defined based on the following criteria:

- The model's outermost boundaries were determined based on previous modelling studies in the Clarence-Moreton Basin (Parsons Brinkerhoff, 2013) and Surat Basin (QWC, 2012; Moore et al., 2014) and common modelling practice. They were placed to encompass the potential impact zone from previous studies and to be far enough from the coal seam gas development area, such that they do not interfere with the modelling results, that is, it eliminates boundary effects. The distance between the likely development centre and the model boundaries varies from approximately 30 to 70 km.
- Model boundaries should follow existing geological and/or hydrological boundaries.
- Important receptors within and/or close to the development area should be within the areal extents of the groundwater model.

The groundwater model covers a large part of the Richmond river basin, but extends beyond its western border (Figure 5). Hereinafter, the areal extent of the groundwater model is referred to as the model domain.

There are 3934 bores from the National Groundwater Information System (NGIS) (Bureau of Meteorology, Dataset 1) located within the model domain, 3096 of which have construction information that is required to assign bores to aquifers. Among the bores with screen and/or depth information, 145 bores are recorded as being inactive bores, that is, they are labelled as NON (non-functional), RMV (removed), DCM (decommissioned), PRP (proposed), RPL (replaced), or ABN (abandoned) for status (Bureau of Meteorology, Dataset 1). Note that bores in this analysis with unknown status are considered as being active to guarantee that the groundwater model does not under-estimate the likely impacts. There are 2698 of the 2951 active bores that have enough information to be assigned to an aquifer. Furthermore, 187 monitoring bores and 6 exploration bores were excluded from this analysis due to their limited groundwater usage. For the purposes of this report, the total number of bores that were analysed was 2505.

1.5.1.2.1 Current water accounts

Actual measured groundwater usage data are not available for bores within the model domain; hence, they were estimated using the allocation data in the NSW state groundwater database (Bioregional Assessment Programme, Dataset 2). It is assumed that 100% of the allocation will be used. Not all bores require a licence to extract water, for example, stock bores under the basic water right. When an allocation entry is missing for a bore, the median value of the bores with allocations within the same purpose group was adopted. For example, 827 domestic bores are not tied with allocations in the model domain, while 429 domestic bores have allocations. The median allocation of the 429 bores was assigned to the other 827 domestic bores as assumed current water usage. Using this interpolation method, the resulting estimates for water usage are shown in Figure 5, which demonstrate that 88.1% of the bores have allocations of less than or equal to 5 ML/year.

Table 7 and Figure 6 show the estimated water usage categorised by purposes. The NGIS and NSW state groundwater database both have a purpose record for most bores of interest; however, the records in the two databases are not always consistent. The NGIS was used as the primary reference for definition purposes. When an assignment was deemed to be unreasonable on a judgment basis, the definition in the NSW state groundwater database was adopted. The definitions of the purpose codes of the NGIS are described in Table 8. Almost half of the water (49.5%) is consumed by irrigation and 42% of the estimated water usage is attributed to domestic and stock bores. The total volume of groundwater consumed by other users is significantly less that that extracted for irrigation and stock/domestic use.

Table 7 Estimated groundwater usage categorised by purpose in the model domain of the groundwater model for the Clarence-Moreton bioregion

Purpose[a]	Number of bores	Total volume (ML/y)	Mean volume per bore (ML/y)	Median volume per bore (ML/y)
COMS	2	40	20	20
HUSE	1301	2,774	2.13	2
INDS	29	348	12	12
IRAG	212	5,750	27.12	15
RECN	7	97	13.86	10
STOK	950	2,097.5	2.21	2
WSUP	4	512	128	105
Total	2505	11,618.5	29.3	2

Data: Bureau of Meteorology (Dataset 1), Bioregional Assessment Programme (Dataset 2)
[a]Refer to Table 8 for the code definition

Table 8 Bore purpose code definition in the National Groundwater Information System (NGIS) for the Clarence-Moreton bioregion

Code	Definition
COMS	Water supply for commercial activities i.e. a service business that does not fabricate a product
HUSE	Water supply for household needs e.g. washing, toilet
INDS	Water supply for manufacturing and industry
IRAG	Water supply for irrigated agriculture
RECN	Recreational purposes
STOK	Water supply for livestock
WSUP	Water supply, e.g. town water supply

Data: Bureau of Meteorology (2013)

The estimated water usage by aquifers is described in Table 9 and Figure 7. The Richmond River alluvium and Lamington Volcanics represent the two main groundwater supply aquifers in the model domain with 3474 ML/year and 6501.5 ML/year allocated to 672 and 1325 bores screened in those two aquifers, respectively. Bores screened in the Grafton Formation and the Walloon Coal Measures are allowed to pump 964 ML/year and 514 ML/year, respectively. The sum of the

estimated water usage for the other five hydrogeological units represents only 165 ML/year. Although 1833 of the 2505 bores are screened in the bedrock aquifers, most of them were drilled in the unconfined part of the bedrock aquifers (i.e. non alluvial).

Table 9 Estimated groundwater usage categorised by hydrogeological units in the model domain of the groundwater model for the Clarence-Moreton bioregion

Hydrogeological unit	Number of bores	Total volume (ML/y)
Alluvium	672	3474
Lamington Volcanics	1325	6501.5
Grafton Formation	308	964
Bungawalbin Member	29	60
Kangaroo Creek Sandstone	28	66
Walloon Coal Measures	127	514
Koukandowie Formation	8	14
Gatton Sandstone	2	14
Woogaroo Subgroup	6	11

Data: Bureau of Meteorology (Dataset 1), Bioregional Assessment Programme (Dataset 2)

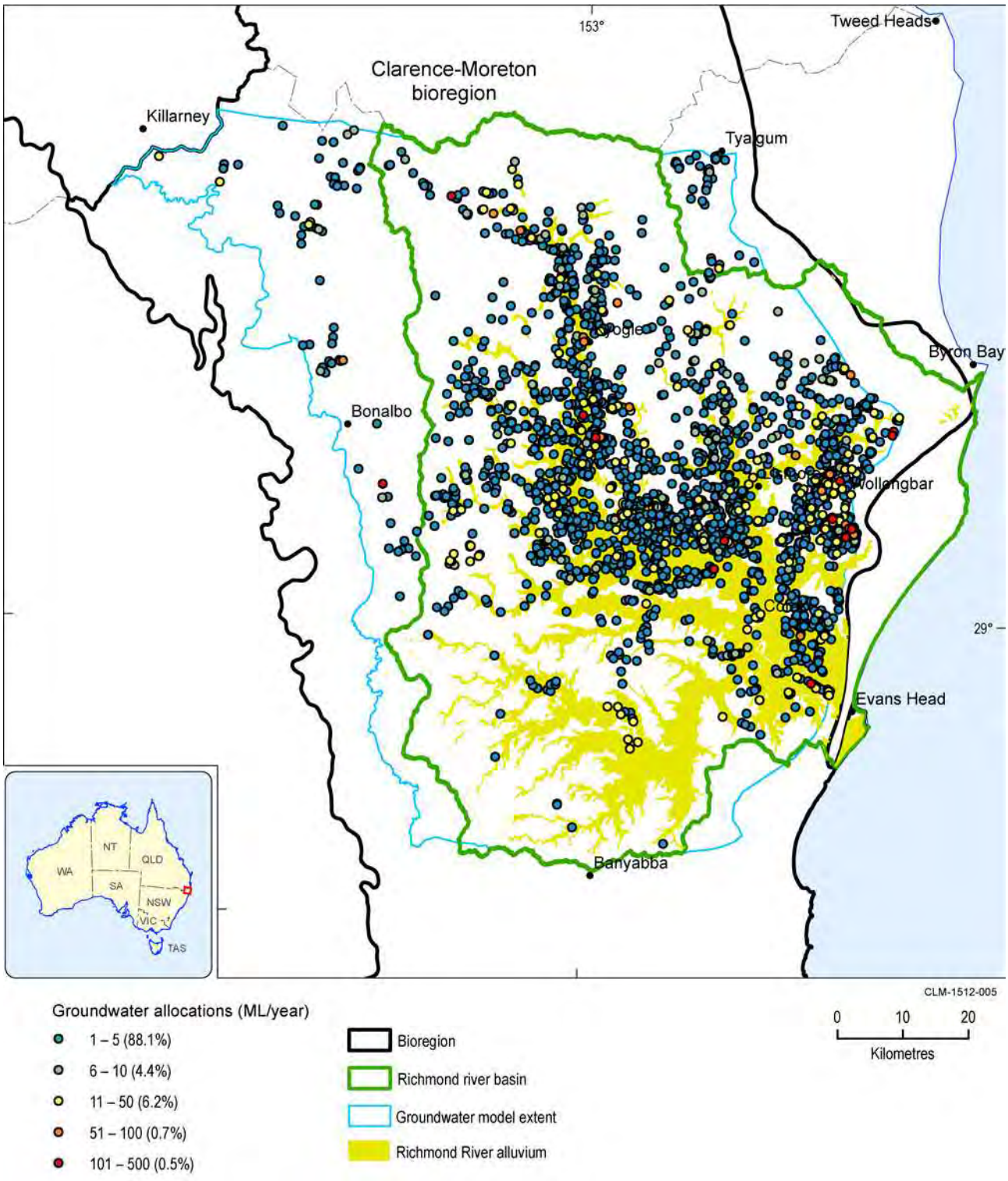

Figure 5 Estimate of groundwater usage per bore within the model domain of the groundwater model for the Clarence-Moreton bioregion. The estimation was based on available allocation data with an assumption that 100% of the allocation will be used

Data: Bureau of Meteorology (Dataset 1), Bioregional Assessment Programme (Dataset 2)

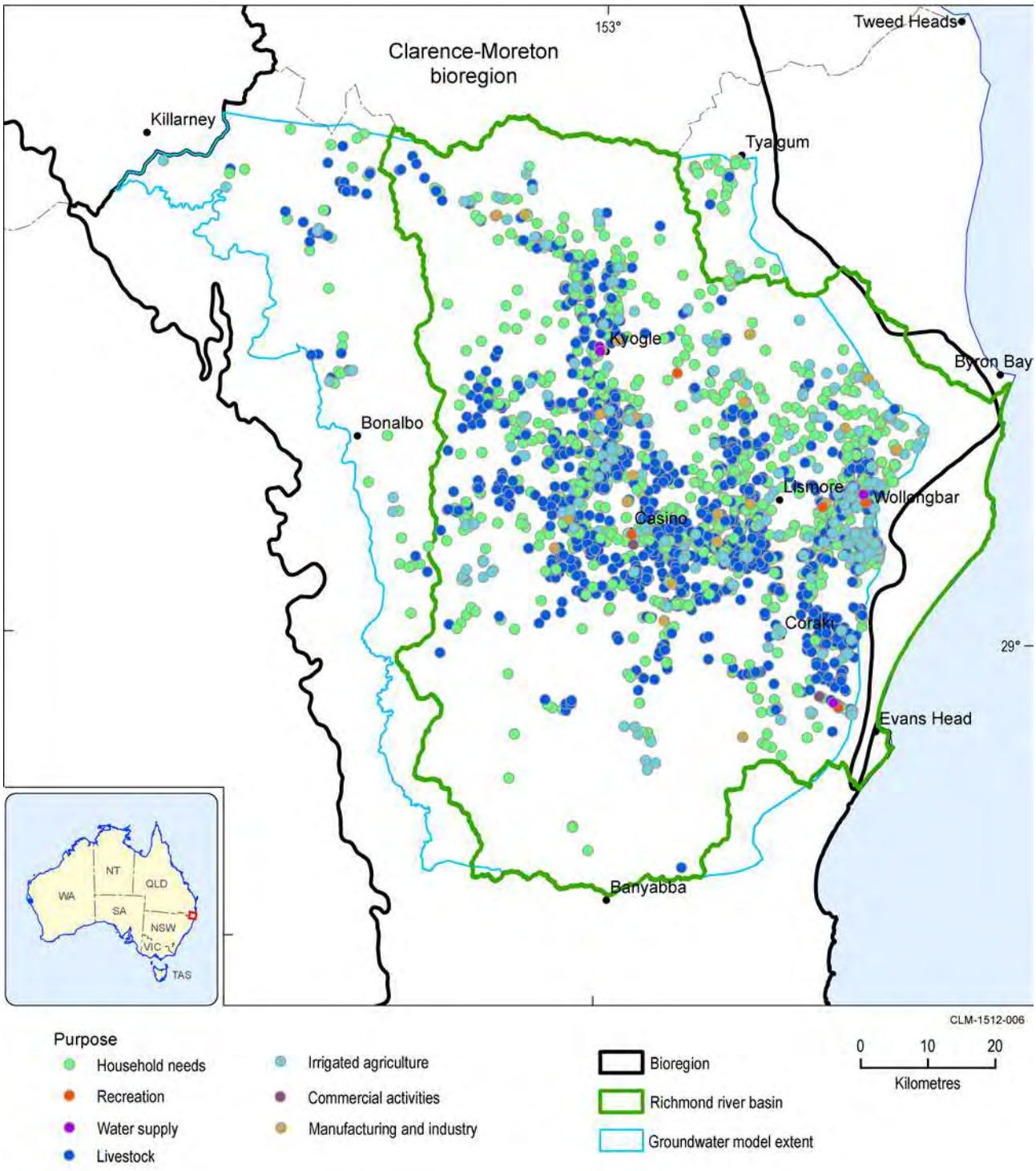

Figure 6 Distribution of bores classified by purpose within the model domain of the groundwater model for the Clarence-Moreton bioregion

Data: Bureau of Meteorology (Dataset 1), Bioregional Assessment Programme (Dataset 2)

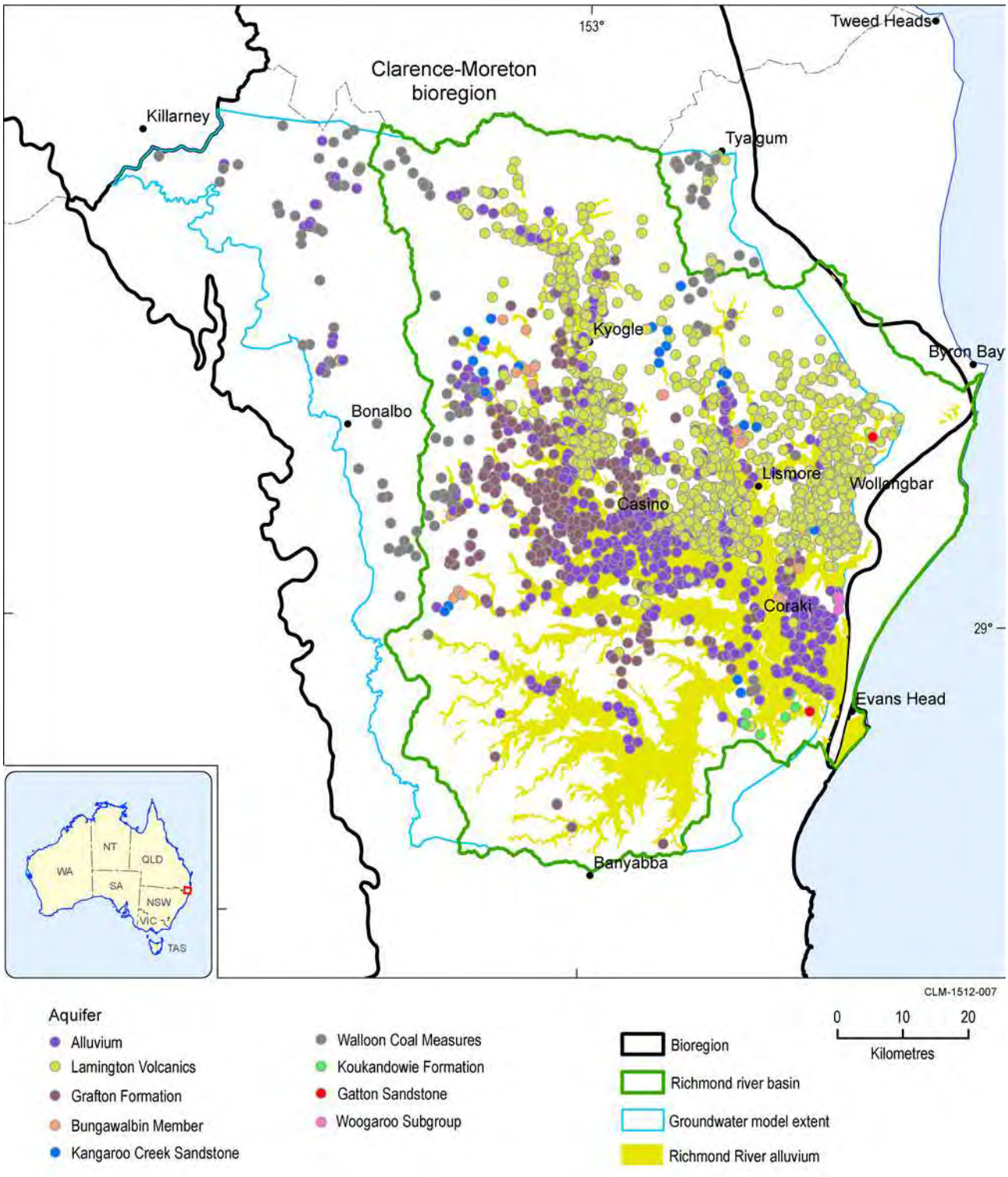

Figure 7 Distribution of bores classified by aquifer within the model domain of the groundwater model for the Clarence-Moreton bioregion

Data: Bureau of Meteorology (Dataset 1), Bioregional Assessment Programme (Dataset 2)

1.5.1.2.2 Water management

In NSW, water sharing plans (WSPs) are developed to preserve surface water and groundwater by balancing the competing demands by different types of water users. They are defined based on surface river basins and groundwater systems. The model domain is covered mainly by the WSP for the Richmond River Area Unregulated, Regulated and Alluvial Water Sources, although it is also

associated with three other WSPs (Figure 8). The public exhibition of the Draft Water Sharing Plan for the Clarence Unregulated and Alluvial Water Sources was being finalised as this report was being drafted (DPI, 2015a). The WSP for the Alstonville Plateau Groundwater Sources overlaps with the WSP for the Richmond River Area Unregulated, Regulated and Alluvial Water Sources, however, it was developed specifically for the Cenozoic basalt aquifer between Lismore and Alstonville. The water sharing plan was originally due in July 2014, but its due date has been extended to July 2015. There has been a proposal to merge this WSP into the North Coast Fractured and Porous Rock Groundwater Sharing Plan to form a uniform WSP for the fractured and porous rock groundwater sources on the North Coast of NSW (DPI, 2015b). More details about these WSPs can be found in NSW Office of Water (2015).

Table 10 provides a breakdown of the number of bores and estimated usage in ML/year as per WSPs. It is shown that 1967 bores (79% of the total) within the model domain are managed under the WSP for the Richmond River Area Unregulated, Regulated and Alluvial Water Sources; 49 Walloon Coal Measures bores, 19 alluvial bores, and 1 basalt bore are located in the Draft Water Sharing Plan for the Clarence Unregulated and Alluvial Water Sources; 434 bores (17% of the total) are screened in the Alstonville basalt that is managed by the WSP of the Alstonville Plateau Groundwater Sources.

Table 10 Estimated groundwater usage categorised by water sharing plan in the model domain of the groundwater model for the Clarence-Moreton bioregion

Hydrogeological unit	Number of bores	Total volume (ML/y)
The Richmond River Area Unregulated, Regulated and Alluvial Water Sources	1967	7877
The Alstonville Plateau Groundwater Sources	434	3212
The Clarence Unregulated and Alluvial Water Sources	69	449
The Tweed River Area Unregulated and Alluvial Water Sources	35	80

Data: Bureau of Meteorology (Dataset 1), Bioregional Assessment Programme (Dataset 2), NSW Office of Water (Dataset 3)

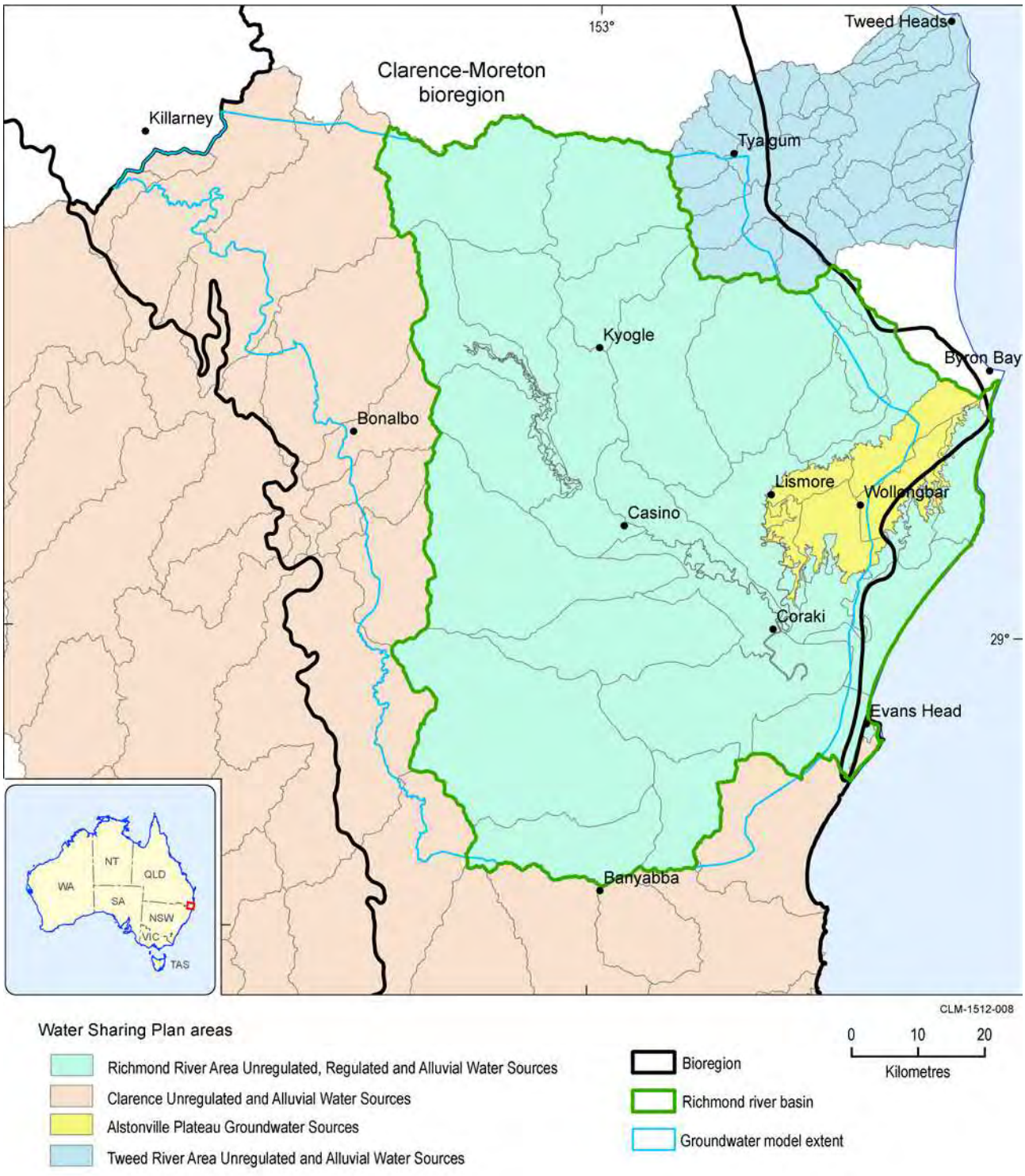

Figure 8 Distribution of water sharing plans (WSP) within the model domain of the groundwater model for the Clarence-Moreton bioregion

Data: Bureau of Meteorology (Dataset 1), Bioregional Assessment Programme (Dataset 2), NSW Office of Water (Dataset 3)

1.5.1.2.3 Gaps

The water account analysis presented in this report was based on allocation data rather than metered actual water usage. This type of analysis generally overestimates the actual groundwater usage. Uncertainties also exist in the allocation data with many bores lacking allocation entries in the NSW state groundwater database. There are inconsistencies between the NGIS and the NSW

state groundwater database regarding the purpose information of the bores. Although great efforts were allotted to assign bores to different aquifers, the accuracy of the assignment cannot be guaranteed either due to the lack of stratigraphy boundary information or due to its inferior quality.

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1.5.2 Water quality

Summary

The largest collection of water quality data (groundwater and surface water) for the Richmond river basin is maintained by the New South Wales Government. These data include continuously collected water quality parameters and targeted sampling campaigns. Continuously collected surface water quality data are not widely available for gauging locations in the Richmond river basin and most of the measurements that are available only commenced in 2013. Continuous surface water quality measurements include salinity (represented by electrical conductivity) and water temperature and are collected in the tidal reaches of the system. Changes in continuously measured electrical conductivity is linked to flow conditions in the river basin.

Targeted surface water sampling campaigns have been carried out in the past with databases held by both the NSW Department of Environment and Heritage (Dataset 1), and the New South Wales Office of Water (Dataset 2). A large number of surface water quality parameters have been monitored through the Richmond river basin but the most commonly reported are electrical conductivity, pH and turbidity. Using the Australian and New Zealand Guidelines for Freshwater and Marine Water Quality (ANZECC/ARMCANZ, 2000), most water quality parameters were found to fall within acceptable levels, however, there were times where limits were exceeded for the most commonly reported parameters.

Groundwater quality data are available from the New South Wales Office of Water for more than 500 bores within the Richmond river basin. Parameters that are most commonly measured are salinity (represented by electrical conductivity) and pH, collected over a time span from 1971 to 2007. The freshest groundwater within the Richmond river basin is contained within the Lamington Volcanics. Groundwater salinity within the alluvial aquifers is more variable, ranging from very fresh to saline, depending on the location within the river basin. Only limited water quality measurements exist for the deeper bedrock aquifers within the Richmond river basin; to provide a baseline understanding of groundwater quality within the major aquifers, observations from other areas within the Clarence-Moreton bioregion are also reported in this report.

1.5.2.1 Surface water

This product summarises water quality information in the Richmond river basin. Surface water quality may be directly impacted by runoff from areas altered by coal mines or coal seam gas (CSG) developments (areas cleared of vegetation, service roads, and site processing facilities), discharge of mine or CSG waters and leaking of hydrocarbons. A number of physical and chemical parameters may be altered by potential coal and CSG developments, including turbidity, suspended solids, pH, heavy metals concentration, salinity, and the presence of hydrocarbons. It is worth noting that there is currently a lack of data on the presence of hydrocarbons as a result of coal mining and CSG operation and development in the Clarence-Moreton bioregion.

The National Land and Water Resources Audit provides the only consistent bioregion-wide assessment of water quality (NLWRA, 2001). The National Land and Water Resources Audit provided data on the export of sediment, nutrient and phosphorus for the Richmond river basin and these were summarised in Section 1.1.5 of companion product 1.1 for the Clarence-Moreton bioregion (Rassam et al., 2014). A follow up report for the National Land and Water Resources Audit (NLWRA, 2002a, 2002b) presented broader regional assessments and developed indices to facilitate comparison of basin and river condition. Section 1.1.5 also summarised some targeted monitoring campaigns reported in the scientific literature for the Richmond river basin. The Richmond River County Council monitors electrical conductivity, pH, dissolved oxygen, temperature and turbidity at four locations within the estuary.

The NSW Office of Water conducts two types of monitoring: continuous monitoring in river gauging stations and targeted monitoring campaigns for a specific duration and purpose (NSW Office of Water, 2014). The remainder of this section will include a description of these two types of water quality monitoring products.

1.5.2.1.1 Water quality in the Richmond river basin

Continuous monitoring

Of the active streamflow gauging sites in the Richmond river basin there are only two with continuous salinity and water temperature measurement datasets that are over one year in duration. These two gauges are Bungawalbyn (203450) and Richmond at Oakland Road (203470) and both are stations that only report river level as they are within the tidal zone of the basin. Monitoring of water quality parameters (salinity and temperature) at these two locations only commenced in early 2013. Data on the same parameters is also available for the Richmond River at Coraki (203403) but only since early 2014.

The data for Bungawalbyn (203450) and Richmond at Oakland Road (203470) can be seen in Figure 9 and Figure 10 for the 2013 to 2014 water year. For both sites, the monitoring locations exhibit seasonal water temperature characteristics which are likely to reflect variations in incoming solar radiation. On the other hand the salinity (expressed as electrical conductivity) in both systems seems to exhibit an increasing trend through the dry season, possibly in relation to decreases in baseflow and larger tidal influence, and then an abrupt decrease following a large flow event in March 2014. The salinity at Bungawalbyn ranges from 200 µS/cm after a large flow has been through the system (indicated by a big change in level) to nearly 1300 µS/cm before the next flushing event. A similar trend is shown at the Richmond River at Oakland Road although at this site maximum salinity is less than 800 µS/cm. These systems experience quite large ranges of salinity which may reflect variations in baseflow and tidal influences.

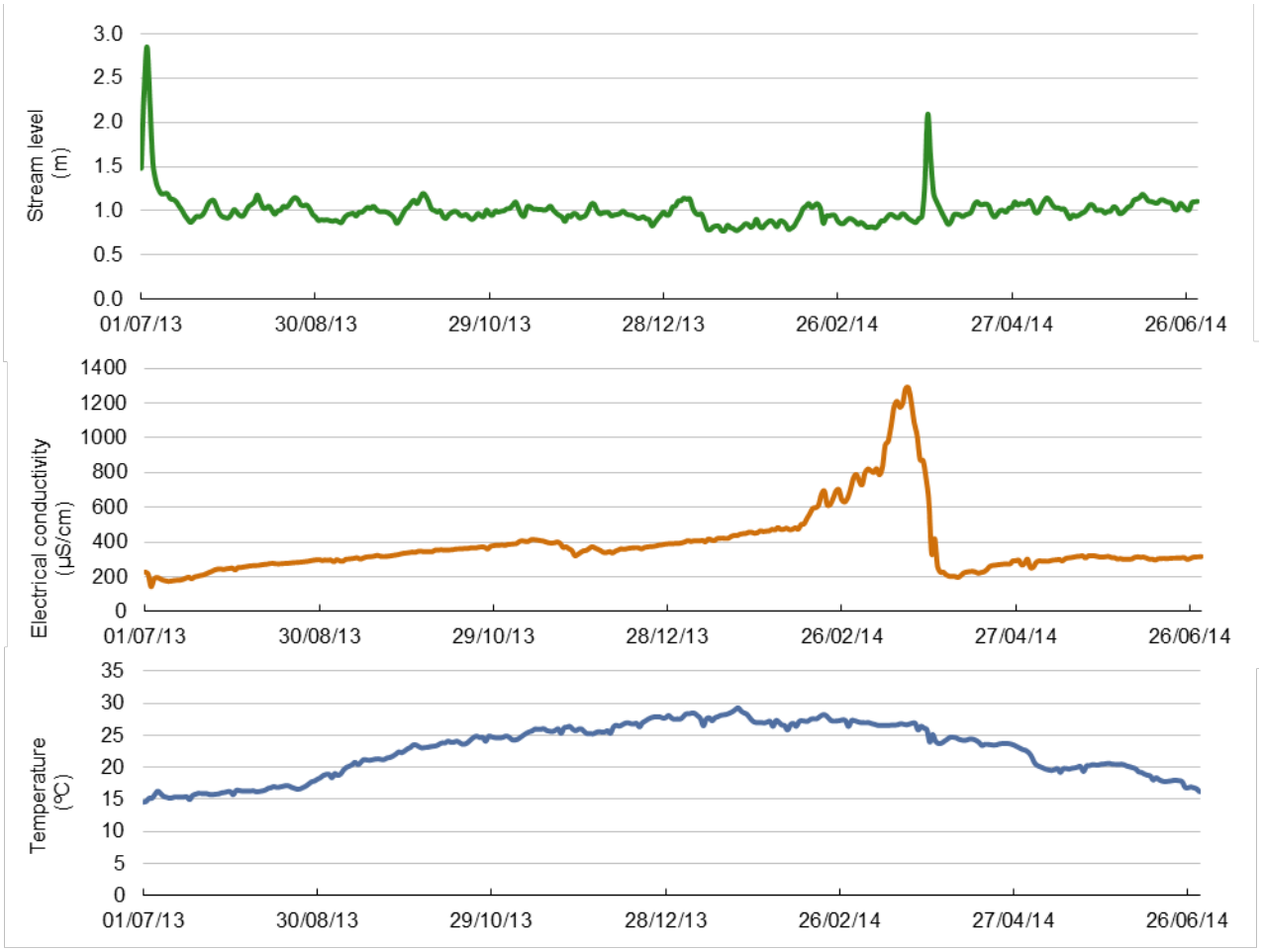

Figure 9 Stream level (top), electrical conductivity (middle) and water temperature (bottom) at gauge 203450 Bungawalbyn for the 2013 to 2014 water year for the Clarence-Moreton bioregion

Data: NSW Office of Water (Dataset 3)

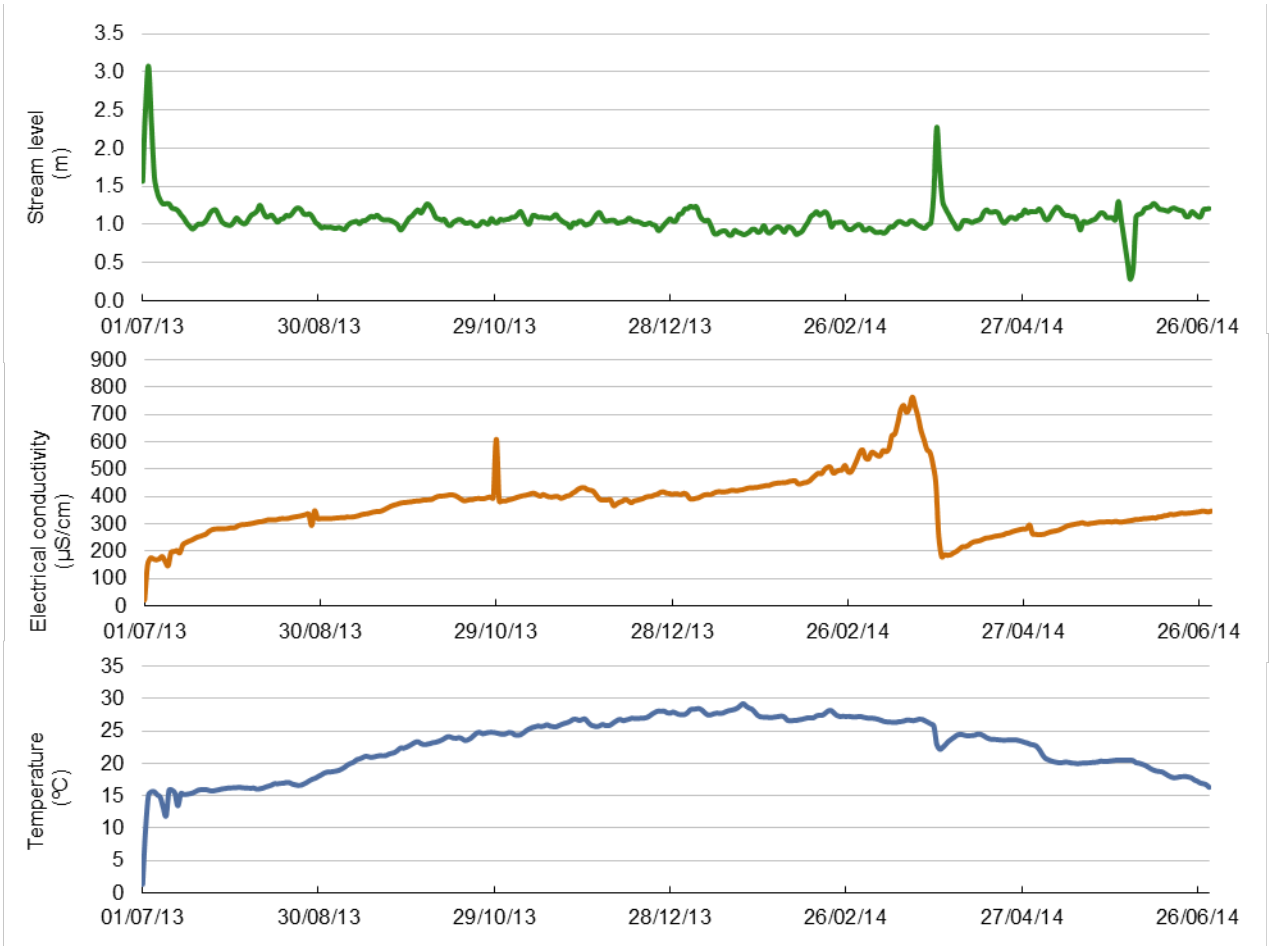

Figure 10 Stream level (top), electrical conductivity (middle) and water temperature (bottom) at gauge 203470 Richmond at Oakland Road for the 2013 to 2014 water year for the Clarence-Moreton bioregion

Data: NSW Office of Water (Dataset 3)

Targeted monitoring

A range of other water sampling campaigns have also been undertaken to collect data for various reports and projects; some of these are summarised below. There are two main datasets to draw upon here: 1) the NSW Department of Environment and Heritage Historic Water Quality Data (Dataset 1), and 2) NSW Office of Water Data (Dataset 2).

State of the catchments – Northern Rivers Region (Dataset 1)

In 2010, the NSW Government undertook a *State of the catchments* report for the Northern Rivers region, which includes the Richmond river basin (DECCW, 2010). In this report trends in water temperature, electrical conductivity and turbidity were presented for Richmond River at Kyogle, Wilson River at Eltham and Richmond River at Casino. This report acknowledges that there is low confidence in electrical conductivity and temperature data due to data gaps and errors and medium confidence in turbidity which was not measured past 2000.

Water Quality of Tweed, Brunswick, Richmond and Clarence rivers (Dataset 1)

This is an extensive dataset of more than 500 samples collected from 48 locations between 15 May 1994 and 12 April 1995. Water quality parameters available include turbidity, total phosphorus, total nitrogen, pH and temperature.

Other data (Dataset 1)

There are also two very small datasets which form part of the Coastal State Recreation Areas dataset (samples in 2006 and 2008) and the Monitoring River Health Initiative (samples collected between 1994 and 1999) (Turak et al., 2000). These both include measurements of electrical conductivity, turbidity, pH and temperature. The Coastal State Recreation Areas dataset has measurements for four locations in the Richmond river basin, while the Monitoring River Health Initiative dataset includes targeted observation from 31 sites with data collected six monthly.

New South Wales Office of Water dataset (Dataset 2)

The NSW Office of Water has a very large database of water quality data collected over many years and includes data collected at locations in the Richmond river basin. The types of water quality parameters collected in the Richmond river basin are extremely diverse (e.g. nutrients, temperature, and aquatic biota) but the three most commonly reported parameters are electrical conductivity (>2900 readings), pH (>2200 readings) and turbidity (>1890 readings). The locations where electrical conductivity was measured, the number of samples collected and their mean, minimum and maximum values are shown in Table 11. Matching analysis for pH and turbidity readings is shown in Table 12 and Table 13, respectively.

The Australian and New Zealand Guidelines for Freshwater and Marine Water Quality (ANZECC/ARMCANZ, 2000) sets acceptable levels for electrical conductivity in the upland and lowland rivers of NSW catchments at between 30 and 350 µS/cm, and 125 and 2200 µS/cm, respectively. Mean values for the Richmond river basin fall within this range however maximum values exceed these ranges at times. Higher electrical conductivity values in the lowland areas are likely to reflect tidal influences in the lower reaches of the Richmond River.

Table 11 Sampling locations, gauge number, number of samples collected and mean, maximum and minimum electrical conductivity measurements for the Clarence-Moreton bioregion

Station name	Station number	Number of samples	Mean (µS/cm)	Maximum (µS/cm)	Minimum (µS/cm)
Coopers Creek at Repentance	203002	113	76	108	30
Richmond River at Casino	203004	212	314	625	1
Richmond River at Wiangaree	203005	70	240	408	116
Lynchs Creek at Wiangaree	203006	65	155	545	50
Terania Creek at Blakes	203007	49	132	839	32
Back Creek at Bentley	203009	96	475	700	105
Leycester Creek at Rocky Valley	203010	112	416	1080	120
Byron Creek at Binnaburra	203012	108	110	345	58

Station name	Station number	Number of samples	Mean (µS/cm)	Maximum (µS/cm)	Minimum (µS/cm)
Wilsons River at Federal	203013	94	93	267	57
Wilsons River at Eltham	203014	262	103	330	1
Goolmangar Coffee Camp	203015	81	235	440	73
Upper Horseshoe Creek	203017	70	164	265	83
Eden Creek at Upper Eden	203018	67	233	320	130
Eden Creek at The Ford	203019	3	224	300	130
Terania Creek at Keerong	203022	82	125	850	36
Ironpot Creek at Toonumbar	203023	191	197	412	16
Coopers Creek at Ewing Bridge	203024	88	94	343	41
Maron Creek at Alstonville	203025	53	90	152	60
Richmong River at Grevillia	203026	47	860	1500	348
Findon Creek at Terrace Creek	203027	63	287	385	170
Fawcetts Plain	203028	85	261	452	90
Myrtle Creek at Rappville	203030	78	300	865	121
Eden Creek at Ettrick	203032	90	384	535	154
Ironpot Creek at Toonumbar VG	203033	7	167	193	137
Eden Creek at Doubtful	203034	92	393	1230	243
Ironpot Creek at Ettrick	203035	107	297	2010	83
Giggergunyah Range River	203036	19	67	81	39
Duck Creek at Alstonville	203037	97	75	249	43
Peraces Creek at Booyong	203038	100	100	135	62
Maguires Creek at Teven	203039	88	105	599	54
Gum Creek at Rous Mill	203040	23	70	150	54
Shannon Brook at Yorklea	203041	96	993	2970	120
Battens Bight at Camir	203044	23	130	286	77
Myall Creek at Gibberagee	203045	27	297	1000	73
Bennys Creek at Eureka	203046	1	96	96	96
Richmond River at Kyogle	203900	67	267	375	143
Goolmangar Creek at Nimbin	203901	7	326	1000	132

Data: NSW Office of Water (Dataset 2)

The Australian and New Zealand Guidelines for Freshwater and Marine Water Quality (ANZECC/ARMCANZ, 2000) sets acceptable pH in the upland and lowland rivers of NSW catchments at between 6.5 and 7, and 6.5 and 8, respectively. Mean values are at times outside of these values and maximum and minimum values often sit outside of the guideline values.

Table 12 Sampling locations, gauge number, number of samples collected and mean, maximum and minimum pH measurements for the Clarence-Moreton bioregion

Station name	Station number	Number of samples	Mean (pH)	Maximum (pH)	Minimum (pH)
Coopers Creek at Repentance	203002	82	7.1	8.6	6.6
Richmond River at Casino	203004	182	7.8	9.2	6.3
Richmond River at Wiangaree	203005	71	7.6	8.3	7.2
Lynchs Creek at Wiangaree	203006	44	7.4	7.8	7.1
Terania Creek at Blakes	203007	47	7.1	7.6	6.7
Back Creek at Bentley	203009	62	7.6	8.1	7.2
Leycester Creek at Rocky Valley	203010	76	7.4	8.1	7.0
Byron Creek at Binnaburra	203012	83	7.1	7.6	6.2
Wilsons River at Federal	203013	62	7.1	8.1	6.6
Wilsons River at Eltham	203014	116	6.9	7.6	5.9
Goolmangar Coffee Camp	203015	51	7.2	7.6	6.9
Upper Horseshoe Creek	203017	45	7.5	8.0	7.0
Eden Creek at Upper Eden	203018	46	7.5	8.0	7.2
Terania Creek at Keerong	203022	46	7.1	7.6	6.8
Ironpot Creek at Toonumbar	203023	177	7.4	8.4	6.0
Coopers Creek at Ewing Bridge	203024	53	7.0	7.4	6.3
Maron Creek at Alstonville	203025	53	6.7	7.5	6.2
Richmong River at Grevillia	203026	47	7.8	8.4	7.4
Findon Creek at Terrace Creek	203027	43	7.7	8.6	6.9
Fawcetts Plain	203028	53	7.4	7.9	7.0
Myrtle Creek at Rappville	203030	78	6.9	7.7	6.3
Eden Creek at Ettrick	203032	62	7.6	8.4	7.3
Ironpot Creek at Toonumbar VG	203033	1	7.2	7.2	7.2
Eden Creek at Doubtful	203034	66	7.6	8.2	7.3
Ironpot Creek at Ettrick	203035	81	7.5	8.3	7.1
Giggergunyah Range River	203036	18	6.8	7.1	6.5
Duck Creek at Alstonville	203037	75	6.6	7.5	6.0
Peraces Creek at Booyong	203038	78	7.0	7.3	6.0
Maguires Creek at Teven	203039	89	7.0	8.1	6.2
Gum Creek at Rous Mill	203040	2	7.4	7.6	7.2
Shannon Brook at Yorklea	203041	96	7.6	8.8	6.9
Battens Bight at Camir	203044	24	6.6	7.3	6.0

Station name	Station number	Number of samples	Mean (pH)	Maximum (pH)	Minimum (pH)
Myall Creek at Gibberagee	203045	24	6.7	7.5	6.3
Bennys Creek at Eureka	203046	1	7.1	7.1	7.1
Richmond River at Kyogle	203900	64	7.7	8.6	7.3
Goolmangar Creek at Nimbin	203901	6	7.4	7.8	6.5

Data: NSW Office of Water (Dataset 2)

The Australian and New Zealand Guidelines for Freshwater and Marine Water Quality (ANZECC/ARMCANZ, 2000) sets acceptable levels for turbidity in the upland and lowland rivers of NSW catchments at between 2 and 25 NTU (Nephelometric Turbidity Unit), and 6 and 50 NTU, respectively. Mean values for the Richmond river basin fall within these ranges however maximum values exceed these ranges at times.

Table 13 Sampling locations, gauge number, number of samples collected and mean, maximum and minimum turbidity measurements for the Clarence-Moreton bioregion

Station name	Station number	Number of samples	Mean (NTU)	Maximum (NTU)	Minimum (NTU)
Coopers Creek at Repentance	203002	68	3.1	22.0	0.7
Richmond River at Casino	203004	196	12.0	232.0	0.1
Richmond River at Wiangaree	203005	57	2.5	18.0	0.5
Lynchs Creek at Wiangaree	203006	34	2.2	18.0	0.4
Terania Creek at Blakes	203007	35	4.5	50.0	0.9
Back Creek at Bentley	203009	41	4.7	54.0	0.4
Leycester Creek at Rocky Valley	203010	62	8.6	150.0	0.6
Byron Creek at Binnaburra	203012	70	3.0	15.0	0.6
Wilsons River at Federal	203013	51	3.1	16.0	0.8
Wilsons River at Eltham	203014	217	5.5	45.0	0.6
Goolmangar Coffee Camp	203015	39	3.4	15.0	0.6
Upper Horseshoe Creek	203017	33	3.8	27.0	0.4
Eden Creek at Upper Eden	203018	36	3.9	25.0	0.4
Terania Creek at Keerong	203022	36	3.6	20.0	0.8
Ironpot Creek at Toonumbar	203023	82	6.2	70.0	0.5
Coopers Creek at Ewing Bridge	203024	43	3.8	24.0	0.8
Maron Creek at Alstonville	203025	42	3.4	15.0	0.8
Richmong River at Grevillia	203026	37	5.5	52.0	0.4
Findon Creek at Terrace Creek	203027	33	3.6	23.0	0.4
Fawcetts Plain	203028	43	5.0	45.0	0.4
Myrtle Creek at Rappville	203030	65	7.4	44.0	0.8

Station name	Station number	Number of samples	Mean (NTU)	Maximum (NTU)	Minimum (NTU)
Eden Creek at Ettrick	203032	50	3.1	25.0	0.3
Ironpot Creek at Toonumbar VG	203033	1	2.1	2.1	2.1
Eden Creek at Doubtful	203034	54	6.1	60.0	0.6
Ironpot Creek at Ettrick	203035	68	5.9	84.0	0.6
Giggergunyah Range River	203036	10	2.1	7.9	0.7
Duck Creek at Alstonville	203037	61	3.4	67.5	0.6
Peraces Creek at Booyong	203038	66	2.6	19.0	0.7
Maguires Creek at Teven	203039	74	2.6	14.0	0.7
Gum Creek at Rous Mill	203040	1	8.0	8.0	8.0
Shannon Brook at Yorklea	203041	80	15.2	434.0	0.7
Battens Bight at Camir	203044	19	24.4	67.0	1.6
Myall Creek at Gibberagee	203045	24	23.1	305.0	1.8
Bennys Creek at Eureka	203046	1	7.1	7.1	7.1
Richmond River at Kyogle	203900	57	5.5	170.0	0.4
Goolmangar Creek at Nimbin	203901	6	5.3	11.0	3.0

Data: NSW Office of Water (Dataset 2)

1.5.2.1.2 Gaps

There is a lack of data on the presence of hydrocarbons as a result of coal mining and CSG operation and development. These data are important for reasons outlined in Section 1.5.2.1.

References

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NLWRA (2001) National Land and Water Resources Audit. Commonwealth of Australia, Canberra, ACT.

NLWRA (2002a) Australian catchment, river and estuary assessment 2002: volume 1, National Land and Water Resources Audit, Canberra, ACT.

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Turak E, Hose G and Waddell N (2000) Australia-wide Assessment of River Health: New South Wales Bioassessment Report (NSW Final Report), Monitoring River Health Initiative Technical Report no 2a, Commonwealth of Australia and NSW Environment Protection Authority, Canberra and Sydney.

Datasets

Dataset 1 NSW Department of Environment and Heritage (2009) NSW Department of Environment and Heritage Historic Water Quality Data. Bioregional Assessment Source Dataset. Viewed 23 March 2015, http://data.bioregionalassessments.gov.au/dataset/4c5f7318-2567-4614-aa35-46aa0eb045f2.

Dataset 2 NSW Office of Water (2013) NSW Office of Water Surface Water Quality Extract 28_nov_2013. Bioregional Assessment Source Dataset. Viewed 23 March 2015, http://data.bioregionalassessments.gov.au/dataset/21234479-eabe-46f9-8af5-9f30847a18ba.

Dataset 3 NSW Office of Water (2015) Richmond stream gauge data. Bioregional Assessment Source Dataset. Viewed 23 March 2015, http://data.bioregionalassessments.gov.au/dataset/03f59f6b-8d06-4513-b662-db7c4c2d2909.

1.5.2.2 Groundwater

This section provides information on groundwater salinity (represented by electrical conductivity or EC) and pH. In addition, it provides basic information on selected trace elements to highlight limitations of the available data, as only a limited number of groundwater samples have been analysed for most trace elements in the Richmond river basin. Further statistical analysis and interpretation conducted on the major ion chemistry of groundwater within the Clarence-Moreton bioregion will be provided in companion product 2.1-2.2 of the bioregional assessment (Raiber et al., 2015), and additional information on water quality and the characteristics of major aquifers are presented in companion product 1.1 for the Clarence-Moreton bioregion (Rassam et al., 2014).

Groundwater quality and chemistry data were compiled from the NSW groundwater bore database (Bureau of Meteorology, Dataset 1). In this database, 501 bores within the Richmond River groundwater model boundary have records for electrical conductivity, and 502 records exist for pH, whereas only a fraction of groundwater bores have trace element chemistry records. Sampling dates range from 1971 to 2007. The time span of four decades over which samples have been collected has implications on data quality, this is attributed to significant changes to sampling protocols, database procedures and most importantly advances in analytical accuracy and precision (e.g. a significant reduction in methods' detection limits has occurred).

There are 3934 bores from the National Groundwater Information System (NGIS) (Bureau of Meteorology, Dataset 1) located within the Richmond River groundwater model domain, 3096 of which have construction information (e.g. screened interval depth) that is required to assign bores to aquifers. However, the majority of groundwater bores contained in the Bureau of Meteorology dataset for the Richmond river basin do not have any stratigraphic records. Without the assignment of the screened interval to a discrete stratigraphic unit, it would be impossible to report on the groundwater quality characteristics of different aquifers. Through data quality checks and interpretations of lithological logs, which are available for most bores, followed by integration of the lithological logs into a preliminary three-dimensional geological model for further checks in the spatial context, it has been possible to generate stratigraphic logs for most groundwater bores. This then allowed assignment of most bores to individual aquifers. The procedure is described in detail in companion product 2.1-2.2 of the Clarence-Moreton Bioregional Assessment (Raiber et al., 2015). Results for EC and pH were only reported for bores where the hydrostratigraphic unit at the screened interval was determined with a high degree of confidence; bores screened across multiple aquifers were not considered.

To assess the potential hazards associated with using groundwater in the Richmond river basin, groundwater chemistry data were compared to national guidelines for water quality in which a number of possible water uses were considered. Water uses considered were: human drinking water, stock drinking water and water for long-term irrigation (defined as up to 100 years). For the assessment of potential adverse impacts associated with using groundwater in the Richmond river basin, groundwater quality parameters were compared to water quality national guidelines provided by the National Health and Medical Research Council (NHMRC and NRMMC, 2011) and the Australian and New Zealand Environment and Conservation Council (ANZECC/ARMCANZ, 2000).

1.5.2.2.1 Electrical conductivity

Electrical conductivity values that represent salinity for the Richmond river basin are presented in Table 14.

Values higher than the EC of seawater (approximately 50,000 µS/cm) were not considered in the assessment. It is possible in coastal catchments that seawater or estuarine water leaks into shallow aquifers. In the Richmond river basin, estuaries and tidal rivers extend far inland (up to Casino), and it is therefore possible that elevated salinities are related to leakage from estuaries or tidal rivers. However, this would still only explain EC's less than that of seawater. Areas where elevated groundwater salinities are observed are located too far from the coast to be explained by seawater intrusion. In areas in Australia where hypersaline salt lakes are present, these can leak into underlying aquifers. However, as there are no hypersaline salt lakes within the Richmond river basin, values higher than seawater are considered incorrect, most probably resulting from either erroneous field measurements and/or database entries. Consequently, 57 measurements ranging from 70,000 to 4,850,000 µS/cm were excluded from calculations of the minimum, maximum and median values presented in Table 14. As only limited water quality records are available for most sedimentary bedrock formations in the Richmond river basin, bioregion-wide range of values (including the Queensland part of the Clarence-Moreton bioregion) are reported in Table 14 to give an indication of the possible range of values for different sedimentary bedrock aquifers, assuming basin-wide similar controls of water quality.

In total, 959 values were compared to Australian Drinking Water Guidelines (ADWG) trigger values for human consumption (NHMRC and NRMMC, 2011) and the National Water Quality Management Strategy (NWQMS) for stock and irrigation water (ANZECC/ARMCANZ, 2000). As a full comprehensive analysis was not conducted for many sampling sites, EC is reported here in favour of total dissolved solids (TDS) concentration similar to other bioregions (e.g. Namoi subregion). The trigger values used for EC are given in Table 14 and are derived from the TDS concentrations in the guidelines, using an approximate conversion factor of 0.64, as recommended in the guidelines and as conducted in other bioregions (e.g. Namoi subregion). The range of EC values in the data is shown in Table 14 together with the proportion of samples in exceedance of the different guidelines.

Insufficient EC data exist for most aquifers, and thus, no spatial interpolation was conducted. Instead, maps showing EC ranges were generated for key aquifers within the Richmond river basin groundwater model domain. For less than 3% of the groundwater bores 10 or more EC measurements exist, and for more than 70% of the groundwater bores only one EC measurement is recorded in the database.

Richmond River alluvium

The EC of alluvial groundwater quality samples within the Richmond river basin ranges from 40 to 48,500 µS/cm, with a median of 885 µS/cm (based on 383 samples) (Table 14 and Figure 11). Approximately 35% of the samples collected from alluvial aquifers exceed the ADWG trigger of 1500 µS/cm, and approximately 10% and 9% exceed the ANZECC (2000) trigger for irrigation and stock water, respectively. The ECs in the headwaters where the alluvial aquifers overlie the Lamington Volcanics and near the coast within the Richmond river basin are generally low. These

low salinities indicate that recharge rates are generally high here. The low salinity of alluvial groundwaters within the extent of the Lamington Volcanics (Figure 11 and Figure 12) also confirms that there is a close hydraulic connection between the Richmond River alluvium and the underlying basalt in the headwaters, where the alluvium primarily consist of coarser sediments such as boulders, gravel and sand. In contrast, higher EC were reported for the central part of the Richmond river basin near Casino (Figure 11). Recharge rates here are likely to be lower due to presence of thick low permeability floodplain sediments at the top of the alluvium, which limit the downwards percolation of water and result in higher rates of evapotranspiration prior to recharge.

Basalt (Lamington Volcanics)

The EC of basalt groundwater samples within the Richmond river basin ranges from 50 to 9250 µS/cm, with a median of 499 µS/cm (based on 249 samples) (Table 14) (Figure 12). Only 13.7% of the samples collected from the basalts exceed the ADWG trigger of 1500 µS/cm, whereas 2.8% and 2.4% exceed the ANZECC/ARMCANZ (2000) trigger for irrigation and stock water, respectively. This suggests that the basalts of the Lamington Volcanics contain the freshest groundwater within the Richmond river basin, and highlights the significance of the Lamington Volcanics as a major recharge area within the Clarence-Moreton bioregion. The role of the Lamington Volcanics as a source of high baseflow volumes was also discussed by Brodie et al. (2007) and in the companion product 1.1 for the Clarence-Moreton bioregion (Rassam et al., 2014).

Grafton Formation undifferentiated

The EC of groundwater quality collected from the Grafton Formation (Piora and Rappville Members undifferentiated) within the Richmond river basin ranges from 80 to 10,100 µS/cm, with a median of 1250 µS/cm (based on 60 samples). Approximately 47% of all samples collected from the Grafton Formation exceed the ADWG trigger of 1500 µS/cm, whereas 3.3% of samples exceed the ANZECC/ARMCANZ (2000) trigger for irrigation.

Orara Formation undifferentiated

No groundwater quality samples from the NSW groundwater database were assigned to the Orara Formation.

Walloon Coal Measures

Within the Richmond river basin, the EC of Walloon Coal Measures groundwater quality samples ranges from 400 to 4460 µS/cm, with a median of 1030 µS/cm (based on 16 samples). Of the samples, 25% exceed the ADWG trigger of 1500 µS/cm, whereas no samples exceed the ANZECC/ARMCANZ (2000) triggers for irrigation or stock water.

Within the entire Clarence-Moreton bioregion, the EC of the Walloon Coal Measures ranges from 86 to 26,500 µS/cm, with a median of 4095 µS/cm based on 92 samples. Approximately 75% of all Walloon Coal Measures groundwater quality samples within the Clarence-Moreton bioregion exceed the ADWG trigger of 1500 µS/cm, and a considerable proportion exceeds the ANZECC/ARMCANZ (2000) triggers for irrigation (approximately 25%) and stock water (approximately 7.6%). The considerable difference to the Walloon Coal Measures groundwater

quality within the Richmond river basin probably suggests that the limited number of samples within the Richmond river basin does not provide a representative overview on the EC distribution or that the Walloon Coal Measures samples follow a different evolutionary pathway in the Richmond river basin.

Koukandowie Formation

No EC measurements exist within the Richmond river basin groundwater model boundary for bores screening the Koukandowie Formation. However, bioregion-wide, the EC of bores screening the Koukandowie Formation ranges from 765 to 20,000 µS/cm (median 4750 µS/cm based on 21 samples). Approximately 14.3% of all Koukandowie Formation groundwater quality samples within the Clarence-Moreton bioregion exceed the ADWG trigger of 1500 µS/cm, and a considerable proportion exceeds the ANZECC/ARMCANZ (2000) triggers for irrigation (approximately 24%) and stock water (approximately 5%).

Gatton Sandstone

No EC measurements exist within the Richmond river basin groundwater model boundary for bores screening the Gatton Sandstone. However, bioregion-wide, the EC of 218 groundwater quality samples collected from bores screening the Gatton Sandstone ranges from 92 to 39,000 µS/cm with a median of 5000 µS/cm. Most Gatton Sandstone groundwater samples (approximately 91%; Table 14) within the Clarence-Moreton bioregion exceed the ADWG trigger of 1500 µS/cm, and a considerable proportion exceeds the ANZECC/ARMCANZ (2000) triggers for irrigation (approximately 30%) and stock water (approximately 3%). This indicates that the Gatton Sandstone contains the most saline groundwater of all sedimentary bedrock formations within the Clarence-Moreton bioregion.

Woogaroo Subgroup

No EC measurements exist within the Richmond river basin groundwater model boundary for bores screening the Woogaroo Subgroup. However, throughout the Clarence-Moreton bioregion, the EC of 237 groundwater quality samples collected from bores screened within the Woogaroo Subgroup ranges from 65 to 20,000 µS/cm, with a median of 870 µS/cm (Table 14). Most samples (68.3%) have EC values below the ADWG trigger values, and only very few samples exceed the ANZECC/ARMCANZ (2000) triggers for irrigation and stock water, respectively. This indicates that the Woogaroo Subgroup contains the freshest groundwater of all sedimentary bedrock formations within the Clarence-Moreton bioregion.

Table 14 Electrical conductivity (EC) in Richmond river basin groundwater model domain compared to water guidelines

	Number of analyses	Minimum value (µS/cm)	Maximum value (µS/cm)	Median value (µS/cm)	ADWG[a] trigger (µS/cm)	Fraction in exceedance of guidelines (%)	Irrigation trigger[b] (µS/cm)	Fraction in exceedance of guidelines (%)	Stock trigger[c] (µS/cm)	Fraction in exceedance of guidelines (%)
All bores undifferentiated Richmond river basin	959	40	48,500	780	1500	29.5%	8000	7.5%	20,000	6.2%
Richmond River alluvium	383	40	48,500	885	1500	34.5%	8000	9.7%	20,000	8.6%
Lamington Volcanics (basalts)	249	50	9,250	499	1500	13.7%	8000	2.8%	20,000	2.4%
Grafton Formation undifferentiated (Piora and Rappville)	60	80	10,100	1250	1500	46.7%	8000	3.3%	20,000	0%
Walloon Coal Measures	16	400	4,460	1030	1500	25.0%	8000	0%	20,000	0%
Walloon Coal Measures (CLM bioregion-wide)	92	86	26,500	4095	1500	75.3%	8000	25.0%	20,000	7.6%
Gatton Sandstone (CLM bioregion-wide)	218	92	39,000	5000	1500	90.8%	8000	29.4%	20,000	2.8%
Koukandowie Formation (CLM bioregion-wide)	21	765	20,000	4750	1500	14.3%	8000	23.8%	20,000	4.8%
Woogaroo Subgroup (CLM bioregion-wide)	237	65	20,000	870	1500	31.7%	8000	1.7%	20,000	0.4%

[a]Based on Australian Drinking Water Guidelines NHMRC and NRMMC (2011) and approximate conversion from TDS to EC. TDS >900mg/L is considered poor.
[b]Based on Table 4.2.5 in the National Water Quality Management Strategy ANZECC/ARMCANZ (2000).
[c]Based on National Water Quality Management Strategy ANZECC/ARMCANZ (2000) and approximate conversion from TDS to EC. TDS >13,000mg/L is the maximum concentration when a decline in health of stock would be expected (ANZECC/ARMCANZ, 2000).
Data: Bureau of Meteorology (Dataset 1), Queensland Department of Natural Resources and Mines (Dataset 2)

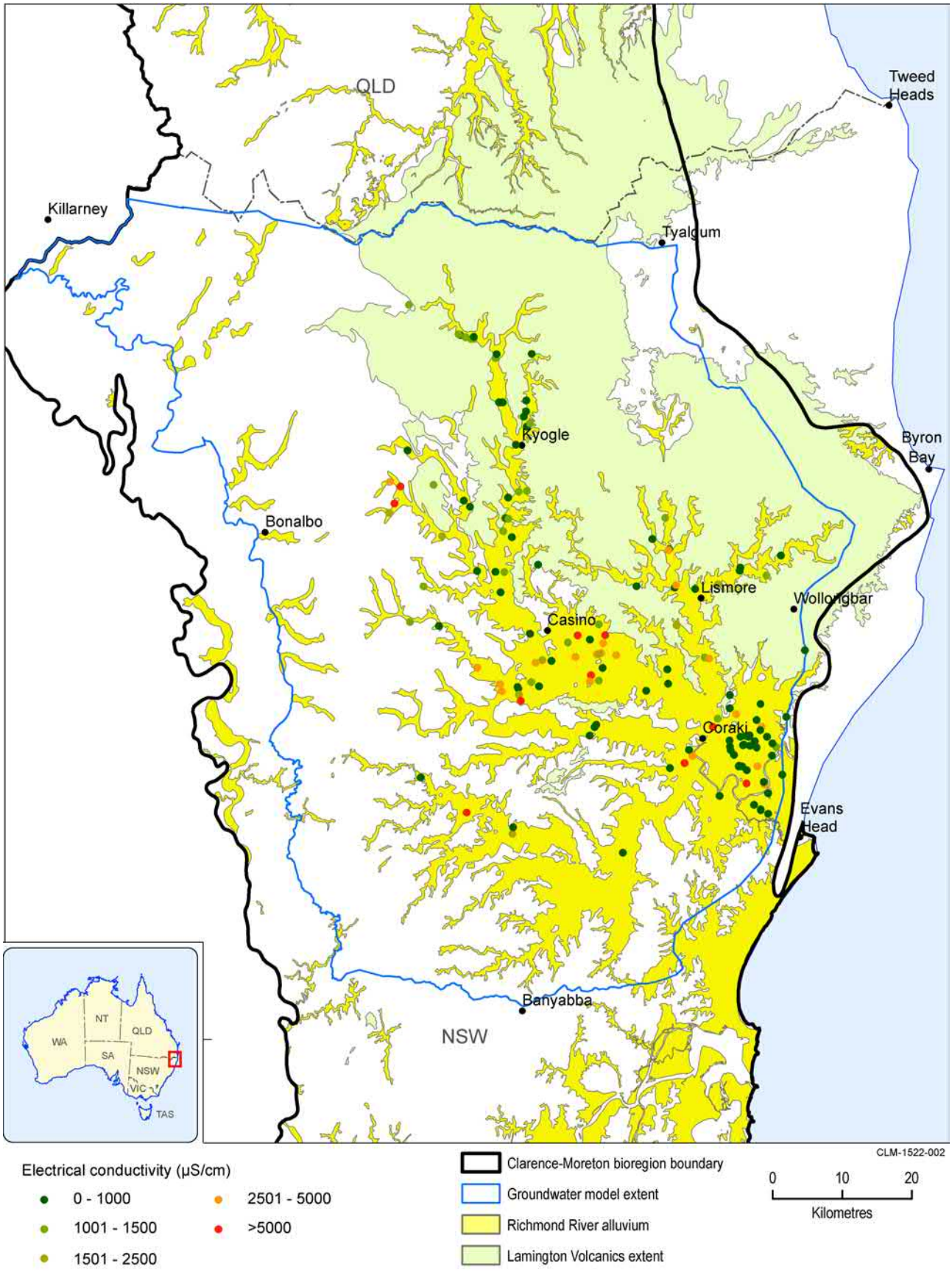

Figure 11 Distribution of electrical conductivity (EC) from alluvial groundwater bores in the Richmond river basin

Data: Bioregional Assessment Programme (Dataset 3)

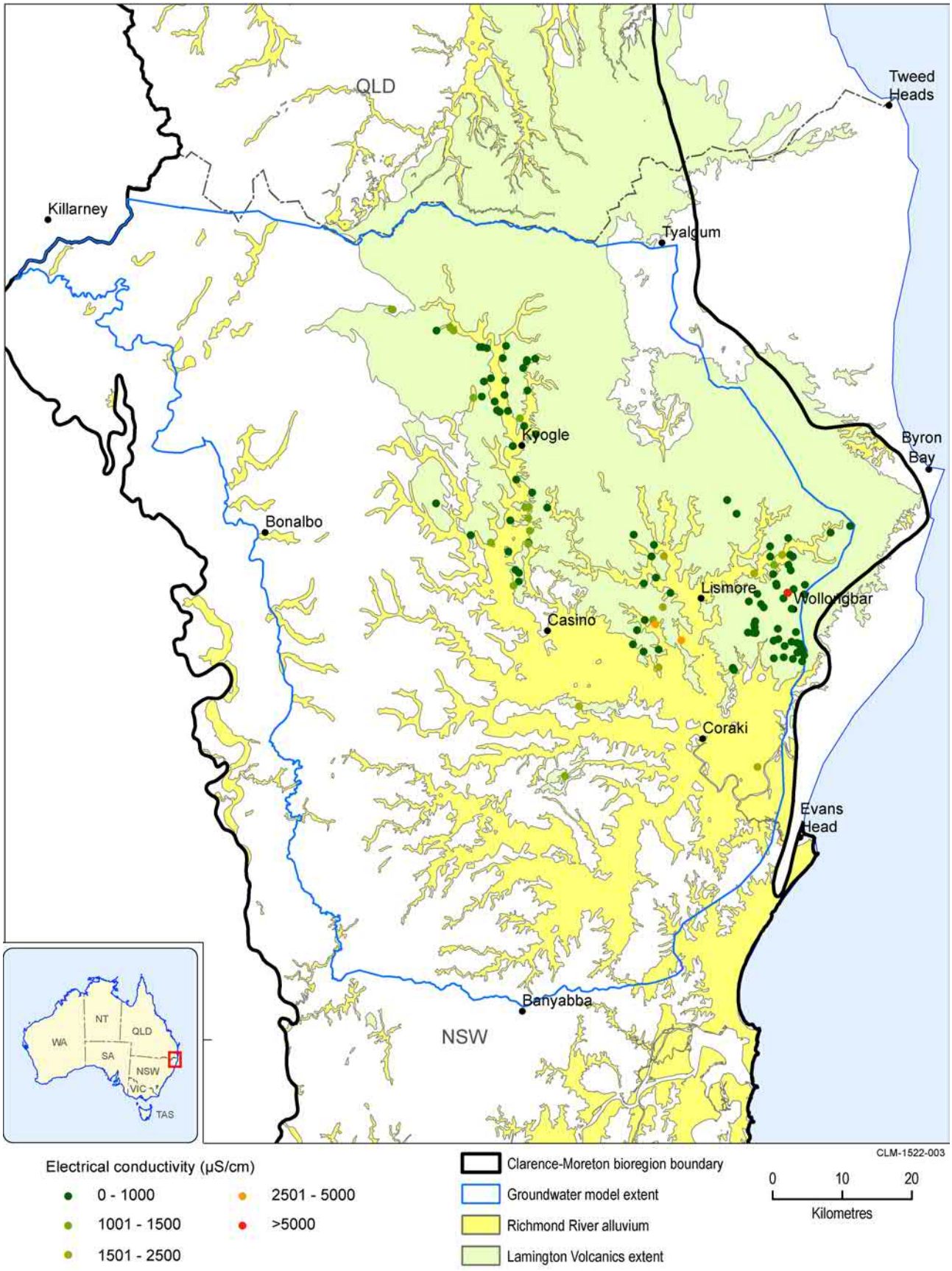

Figure 12 Distribution of electrical conductivity (EC) from Lamington Volcanics (basalt) groundwater bores in the Richmond river basin

Data: Bioregional Assessment Programme (Dataset 4)

One of the problems with pH measurements in the NSW and Queensland groundwater databases is that it is not always clear if the reported value represents the field measurement or the laboratory measurement, and particularly for samples that were collected decades ago, there is considerable uncertainty. In the Queensland Department of Natural Resources and Mines Groundwater Database (Dataset 2), most reported values appear to be laboratory measurements, whereas no information on whether the values represent field or laboratory measurements is provided for NSW.

The pH of groundwater samples in the Richmond river basin varies from 2.8 to 14.0 (Table 15). However, the median pH of most aquifers is within a narrow range from 7.1 to 7.5. The notable exceptions are the median pH of the Walloon Coal Measures (bioregion-wide), the Koukandowie Formation (bioregion-wide) and the Gatton Sandstone (bioregion-wide), which are higher and range from 7.9 to 8.2. While it is unusual for groundwater samples to have pH higher than approximately 9, selected bores within the Walloon Coal Measures and the Gatton Sandstone in the Clarence-Moreton bioregion have been visited during a previous study (Raiber, unpublished data), and these visits have confirmed that a high pH in a similar range as reported in the groundwater database occurs at these sites.

Table 15 Minimum, maximum and median pH for the aquifers in the Richmond river basin and Clarence-Moreton bioregion-wide for selected sedimentary bedrock aquifers

	Minimum pH	Maximum pH	Median pH
All samples (aquifer undifferentiated)	3.0	12.6	7.2
Richmond River alluvium	3.2	8.8	7.1
Basalt	4.4	12.6	7.2
Grafton Formation undifferentiated (Piora and Rapville members)	5.0	8.1	7.5
Walloon Coal Measures (Richmond river basin)	5.0	9.0	7.3
Walloon Coal Measures (Clarence-Moreton bioregion-wide)	5.9	12.0	8.2
Gatton Sandstone (Clarence-Moreton bioregion-wide)	5.2	14.0	7.9
Koukandowie Formation (Clarence-Moreton bioregion-wide)	6.2	8.7	8.1
Woogaroo Subgroup (Clarence-Moreton bioregion-wide)	2.8	9.0	7.2

Data: Bureau of Meteorology (Dataset 1), Queensland Department of Natural Resources and Mines (Dataset 2)

1.5.2.2.2 Trace elements

Only a very limited number of measurements are available for most trace elements, with the exception of aluminium, fluoride, iron and nitrate (Table 16). Exceedances for the trace elements available in the dataset were assessed using the ADWG for human consumption (NHMRC and NRMMC, 2011) and NWQMS (ANZECC/ARMCANZ, 2000) for stock watering and irrigation water (Table 16).

Due to the small number of measurements, the data presented in Table 16 do not provide a representative overview of the variability within the Richmond river basin and hence should be considered with caution. In addition, for some trace elements, difficulties can arise due to the absence of reported detection limits; as an example, this is evident for lead (Pb) where most samples are reported as 0.02 mg/L, and are therefore formally in exceedance of the AWDG trigger of 0.01 mg/L. However, it appears likely that most of these values represent the detection limit, and the actual value may therefore be smaller.

Table 16 Number of analyses and exceedances for trace elements in the Richmond river basin. Concentrations of metals are based on soluble form

	Number of analyses	Minimum value (mg/L)	Maximum value (mg/L)	ADWG[a] trigger (mg/L)	Fraction in exceedance of guidelines (%)	Irrigation trigger[b] (mg/L)	Fraction in exceedance of guidelines (%)	Stock trigger[c] (mg/L)	Fraction in exceedance of guidelines (%)
Aluminium (Al)	29	0.01	6.2	0.2[e]	3.4%	5	3.4%	5	3.4%
Arsenic (As)	17	bd[d]	0.01	0.01	5.9%	NA	0.0%	NA	0.0%
Barium (Ba)	3	bd[d]	bd[d]	2	0.0%	NA	NA	NA	NA
Boron (B)	4	bd[d]	3.3	4	0.0%	0.5	25.0%	5	0.0%
Cobalt (Co)	0	NA	NA	NA	NA	0.05	NA	1	NA
Chromium (Cr)	19	0.01	0.06	0.05	5.0%	1	0.0%	1	0.0%
Copper (Cu)	26	bd[d]	0.06	2	0.0%	1	0.0%	1	0.0%
Fluoride (F)	511	bd[d]	20	1.5	1.6%	1	2.2%	2	1.0%
Iron (Fe)	66	bd[d]	3.7	0.3[e]	24.2%	0.2	24.2%	NA	NA
Manganese (Mn)	26	bd[d]	1.3	0.1[e]	46.2%	0.2	19.2%	NA	NA
Molybdenum (Mo)	0	NA	NA	0.05	NA	0.01	NA	NA	NA
Nickel (Ni)	0	NA	NA	0.02	NA	0.2	NA	1	NA
Nitrate (NO_3)	977	bd[d]	35.02	50	0.0%	NA	NA	NA	NA
Lead (Pb)	NA	NA	NA	0.01	NA	2	NA	0.1	NA
Zinc (Zn)	27	0.01[d]	0.92	3[e]	0.0%	2	0.0%	2	0.0%

[a]Table 3.4.1 in Australian Drinking Water Guidelines (NHMRC and NRMMC, 2011)
[b]Table 4.2.10 in National Water Quality Management Strategy (ANZECC/ARMCANZ, 2000)
[c]Table 4.3.2 in National Water Quality Management Strategy (ANZECC/ARMCANZ, 2000)
[d]Below detection limit
[e]Aesthetic water quality trigger (not health related). NA = data not available
Data: Bureau of Meteorology (Dataset 1)

1.5.2.2.3 Gaps

The coverage of bores with available groundwater quality data is limited for the deeper sedimentary bedrock hydrogeological units in the Richmond river basin. This likely reflects that these deeper units have to date not been extensively utilised as groundwater supply aquifers (most of the groundwater extraction occurred from the basalts and the alluvium, as also highlighted in Section 1.5.1 of this product).

The quality of the hydrochemistry data available for this assessment is difficult to determine. Analytical uncertainties or detection limits are not reported in the NSW groundwater quality dataset (Bureau of Meteorology, Dataset 1). The dataset includes groundwater chemistry records that were collected from 1970 to 2007, and the different analytical techniques used during this long period of time involve different levels of accuracy and precision that result in inherent uncertainties. A lack of information on sampling protocols, particularly for trace elements, provides a further source of uncertainty.

The stratigraphic unit at the screened interval is unknown for many bores in the Richmond river basin. As this information is crucial to assess the differences of groundwater quality for different aquifers, one of the biggest challenges was to determine the stratigraphy of the bores, including the identification of the stratigraphic unit at the bore screen from the lithological logs. Following extensive initial data quality checks, this was achieved for a large number of bores by converting the lithological logs to stratigraphic logs and importing the data into a three-dimensional geological modelling software (followed by further substantial cross-checking), as discussed in detail in companion product 2.1-2.2 for the Clarence-Moreton bioregion (Raiber et al., 2015).

Most trace elements have data available for only a few groundwater sampling sites. Where analyses have been performed, several elements have concentrations above ADWG or NWQMS triggers, but the current dataset is too sparse and the quality too uncertain to make conclusions about trigger value exceedances of these elements. Therefore, additional work is required to understand the range and distribution of trace element concentrations in the Richmond river basin.

References

ANZECC/ARMCANZ (2000) National Water Quality Management Strategy: Paper No 4 - Australian and New Zealand guidelines for fresh and marine water quality: Volume 1 - The Guidelines. Australian and New Zealand Environment and Conservation Council and the Agriculture and Resource Management Council of Australia and New Zealand, Commonwealth of Australia, Australia.

Brodie R, Sundaram B, Tottenham R, Hostetler S and Ransley T (2007) An overview of tools for assessing groundwater-surface water connectivity. Bureau of Rural Sciences, Canberra.

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Raiber M, Cui T, Pagendam D, Rassam D, Gilfedder M, Crossbie R, Marvanek S and Hartcher M (2015) Observations analysis, statistical analysis and interpolation for the Clarence-Moreton bioregion. Product 2.1-2.2 from the Clarence-Moreton Bioregional Assessment. Department of the Environment, Bureau of Meteorology, CSIRO and Geoscience Australia, Australia. Viewed 20 July 2015, http://data.bioregionalassessments.gov.au/product/CLM/CLM/2.1-2.2.

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Datasets

Dataset 1 Bureau of Meteorology (2014) NSW Office of Water – National Groundwater Information System. Bioregional Assessment Source Dataset. Viewed 23 March 2014, http://data.bioregionalassessments.gov.au/dataset/7ab9820e-1e43-4600-8875-a0834345fb6d.

Dataset 2 Queensland Department of Natural Resources and Mines (2014) Queensland groundwater bore data – update March 2014. Bioregional Assessment Source Dataset. Viewed 10 March 2014, (record pending).

Dataset 3 Bioregional Assessment Programme (2015) CLM - Richmond river alluvium Electrical Conductivity v01. Bioregional Assessment Derived Dataset. Viewed 19 October 2015, http://data.bioregionalassessments.gov.au/dataset/608d1699-2267-41db-bbfc-c89499fc0136.

Dataset 4 Bioregional Assessment Programme (2015) CLM - Richmond river basalt Electrical Conductivity v01. Bioregional Assessment Derived Dataset. Viewed 19 October 2015, http://data.bioregionalassessments.gov.au/dataset/e6457df0-71f9-4139-bd6e-d16558f3d3d7.

www.bioregionalassessments.gov.au

Australian Government
Department of the Environment
Bureau of Meteorology
Geoscience Australia

CSIRO

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ATTACHMENT 12

Community Consultative Committee Minutes 2019

MINUTES OF NRQA COMMUNITY CONSULTATIVE COMMITTEE MEETING

Friday 22 November 2019 – Goolmangar Hall – Goolmangar NSW – 4:00pm

Present: [redacted] (Chairperson) [redacted] (Director, Infrastructure Services) [redacted] (Compliance Coordinator) [redacted] (Quarry Production Supervisor) [redacted] (Administration)

Community Committee Members: [redacted]

Apologies: [redacted] (LCC [redacted]

Welcome

The Chairperson – [redacted] - opened the meeting at 4.10pm and welcomed all members.

Previous Minutes

Overview of previous meeting and minutes were accepted as being true and correct.

Business arising from minutes of previous meeting:

Stray cattle and fencing

[redacted] advised the committee that other peoples' stray cattle coming into her property through the back boundary of her property. This is causing issues as she is concerned with spread of cattle ticks. [redacted] also concerned about being quarantined in the future and having to go through the processes of impoundment of stray cattle. [redacted] advises she would like fencing of Quarry boundaries to be a priority – especially now that during drought when cattle are looking for feed.

[redacted] advised the Committee no cattle or evidence of cattle have been sighted suggesting no cattle movements through the Quarry lands. [redacted] also confirmed the temporary electric fencing has been put in place along entrance road to prevent cattle movements from property owner [redacted].

[redacted] sent a message via [redacted], that he also advised he would like to see a permanent fence up beside the road, (instead of the temporary electric fence currently there).

[redacted] surmised that there are two issues to be looked into 1) the temporary electric fencing, and 2) check other quarry boundary fences.

[redacted] advised the committee that no cattle are kept by Council. Council happy to discuss boundary fences with landholders. However further discussions and negotiations would need to be had around funding if required, as Council are not running any livestock. Further should cattle be moving through the quarry lands unknowingly, landholders need to advise Council and provide information on where these incidences are occurring. As presently Council unable to comment on any other boundary fencing issues.

Additionally, [redacted] commented that regarding [redacted] land, the fencing has been pegged and there is budget in place for this work to commence. Further fencing along [redacted] land is being progressively fenced.

HVAS Testing

[redacted] informed the Committee that as part of the Air Quality Management required at the Quarry, a HVAS (High Volume Air Sampling) was undertaken last November. The monitor was placed on [redacted] property. Results from the report came back that dust particles were well below NSW requirements which was a good outcome.

Annual Environmental Monitoring Report (AEMR)

[redacted] informed the Committee that the 2018 AEMR was completed and submitted to the Department of Planning and Environment (DPE) for review. The DPE has responded to Council advising it did not have any issues regarding this report.

The report can be found on Council's website.

[redacted] asked where on the website can it be located – and could Council send an email link for easy access.

The Annual Environmental Management Report 2018 can be found under the Business and Industry Tab, Environmental Reporting. Go to www.lismore.nsw.gov.au

[redacted] informed the Committee that the Council's Quarry website page is also updated regularly with other environmental monitoring data and information.

Wild dog baiting

[redacted] informed the committee that she thinks the wild dog baiting needs to be a combined issue between all neighbours and the Quarry.

[redacted] has advised the Committee that whilst she undertook the baiting in previous years on the Council land, in conjunction with approval from the Local Land Services (LLS), she is unable to continue with this assistance due to an allergy issue with ticks.

[redacted] agreed there are wild dogs around and commented it is better if everyone baits at same time. Also, her current baiting notices have expired, and the 6 monthly Local Land Service notices are a better option as this gives everyone a chance to get baiting done, and timeframes can overlap.

[redacted] agreed that wild dogs have been sighted, however she wasn't sure if the LLS has the capacity either to deliver baits or if there are baits available at the moment due to recent fire impacts. She suggested Council check with LLS.

[redacted] confirmed that Council/ Quarry would organise to have someone to lay Quarry baits. [redacted] agreed that Council would follow up on the availability of baits with LLS and liaise with relevant stakeholders for a targeted approach.

Correspondence

[redacted] advises email correspondence regarding the wild dog baiting is the only correspondence since last meeting.

General Business.

[redacted] informed the Committee that the Quarry is not running at full capacity and at approximately 50% production.

[redacted] asked if quarry running at a loss? Is this because of the offset land purchase?

[redacted] responded that compliance costs and acquirement/management of the offset land was expensive but not solely responsible, for example the recently requested Air sampling by the Department cost Council $20,000. Council has been actively working on addressing imposed compliance requirements through thorough auditing which has resulted in significant increases to costs. Noting overheads remain the same regardless of production outcome. The Quarry being licenced as a State Significant Project means additional reporting and compliance requirements.

[redacted] continued advising auditing by Compliance has been undertaken since she commenced with Council last year including, licences, storm water testing, groundwater testing, development applications (DA's) and there have been numerous departmental compliance requests requiring additional budget.

[redacted] asked will the Quarry be looking at more production or will Asphalt be shut down?

[redacted]s advised Council's quarry material is perfect for asphalt - Council supplies the majority of product internally to Council and to the Asphalt plant.

[redacted]commented that when the new General Manager started, the true financials position came out. Council would be looking to where they can cut costs and liabilities.

[redacted] advised the Committee that at present a Consultant was auditing the quarry this week, looking at production and the sales market as it stands. The Quarry has a high-quality rock source but depth of overburden impacts upon the cost to get the rock out of the ground.

Amalgamation of Asphalt and Quarry Development Application

[redacted] informed the Committee that the DA for the Modification has been underway for over 12 months. Quarry and Asphalt plant DA is now with the Department for approval.

There were a couple of objections lodged for this DA, mainly traffic concerns regarding the quality of Nimbin Road. This is now subject to a traffic assessment. Further information requests have been received from RMS and Dept of Planning specifically around the traffic management report. Council has been working with a consultant to address this. More details are still being requested at this time.

[redacted] expressed concerns about quality of Nimbin Road and Booree Creek hill. The road is in shocking condition and she feels this issue is due to the trucks from the Quarry. [redacted] advises the design of the road in relation to the quarry trucks using the road is a serious concern and a danger.

Discussion was then held between Committee members regarding the traffic using Nimbin Road and problems with the cracks in the bitumen. The Committee expressed concerns about the road being more dangerous after rain. Tourists who aren't familiar with the road, and that it's also contains areas that are dangerous to overtake on.

[redacted] advised the Quarry (Commercial Entity) pays (Sect 94) levy on outgoing quarry material. Council receives this payment and is responsible for Nimbin Road maintenance. Noting this meeting was being held by the commercial entity (Blakebrook Quarry) and could not speak for divisions of Council.

[redacted] asked about the time frame for the Traffic assessment.

[redacted] advises it may be looking at January 2020 now, as the consultants need to relook at traffic assessments.

[redacted] advises she feels Community feedback would be required at that point to ensure that it addresses the community's concerns.

[redacted] advises as a state DA process, it would be posted on the Departments website. Therefore it will be a public document.

LEP AMMENDEMENT – E2 Conservation Zoning.

[redacted] informed the Committee this is waiting to be signed off by the Department. The E2 Conservation zoning is around the buffer area of the Quarry. This offers the highest protection of that land available and is considered to be the best option**.** The boundary fencing of the zone however comes with issues as it is difficult to obtain approvals to fence, or clear along fence lines, however the Compliance team is working on this at the moment. Also noting an old disused mine shaft was found in the area to the south and signage was being erected.

[redacted] agrees that maintaining the fences would be an issue. Also asked about selling the quarry – what happens to the E2 land?

[redacted] – this is a permanent security option for the offset land. If the quarry was sold this may go with the Quarry or alternatively remain with Council to manage the 12year strategy.

Rehabilitation Bond Submission

[redacted] The Department has changed the way the bond is calculated. Essentially, the bond is held as security to rehabilitate the Quarry lands if it were to be closed down and rehabilitated. Bond was successfully submitted, approved by the department and executed.

The Annual Environmental Monitoring Report

[redacted] advises there were no non-conformances that came back from the Department regarding this report.

The Groundwater Assessment Report

[redacted] advised this was undertaken at the Departments' request at large expense. As a result of this report, Council was informed it must buy Water Shares for 70 mega litres. Council has submitted an EOI application to purchase the required water shares and is awaiting outcome.

Weed Control

[redacted]a advises regular weed control is undertaken by the Quarry's Bush Regeneration contractors.

Additional Other Business

[redacted]reminded the committee of the process to make a complaint - not through the Quarry weighbridge, but to call Councils Contact Centre so the complaint will be sent to Compliance team to investigate and respond within a set time frame.

[redacted] mentioned that he considered the amount of work undertaken by Quarry and Compliance this last 12 months was considerable.

[redacted]– commended [redacted]on his hard work and efforts.

[redacted] wanted to know about the Quarry's Fire Management plans.

[redacted] added that in the area around the Quarry is generally stuck by lightening one or two times each year which can cause a few fires, but they usually come with rain. [redacted]fully expects a loss if a major fire was to come through at this time with conditions as they are.

[redacted] advises [redacted] has managed the cool fire burn through winters in the past to control and protect the areas.

[redacted]advises she would be happy to work with Council to assist in managing the risk.

[redacted] informed the Committee that Council would investigate this further. Noting with the offset land being protected, biodiversity areas may make clearing for fire breaks challenging.

[redacted]considered there should be a justification of the clearing along the fence lines and better fire management to protect the community and Councils assets.

[redacted]advises the risk is there if you live in the bush.

[redacted]closed the meeting at 5pm.

Next meeting to be advised.

ACTION	ACTION OUTCOME	BY WHOM & WHEN
Contact LLS to enquire about availability of wild dog baits	Contact Committee members and advise outcome	Council – 31 January 2020
Traffic Management Assessment relating to Nimbin Road	Forward link to Departments State projects page to ensure committee members know where to locate assessment information and outcome	Council – 31 January 2020
Council website Quarry records	Forward link to Council records page to ensure committee members can find referenced records	Council – 31 January 2020

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ATTACHMENT 13

Information Available on LCC Website

Schedule 5 Condition 14 – Information to be provided on LCC Website

Document		Available on LCC Website 26/03/20
the documents listed in condition 2(a) of Schedule 2;		N/a - No documents listed in Condition 2(a) of Schedule 2.
current statutory approvals for the project;		-
Part 3A Approval No.07_0020 (Mod 1)		Yes
EPA Licence -3384		Yes
all approved strategies, plans and programs required under the conditions of this approval;		-
Sch. 3 Cond. 5	Noise Management Plan	Yes
Sch. 3 Cond. 9	Blast Management Plan	Yes
	Mine Safety Management Plan	Yes
Sch. 3 Cond. 12	Air Quality Management Plan	Yes
Sch. 3 Cond. 19	Soil and Water Management Plan	Yes
	Groundwater Monitoring and Management Sub Plan	Yes
	Pollution Response Management Plan	Yes
Sch. 3 Cond. 23	Traffic Management Plan	Yes
Sch. 3 Cond. 24	Aboriginal Heritage Management Plan	Yes
Sch. 3 Cond. 28	Biodiversity and Rehabilitation Management Plan	Yes
	Biodiversity Strategy	Yes
Sch. 5 – Cond. 1	Environmental Management Strategy	Yes
a comprehensive summary of the monitoring results of the project, reported in accordance with the specifications in any conditions of this approval, or any approved plans and programs;		-
Blast Reports – 2019		N/a (No blasts in 2019)
Noise Monitoring Reports – 2019		Yes
Dust Monitoring Summary Results – 2019		Yes
Ground Water Monitoring Results - 2019		Yes
Surface Water Monitoring Results - 2019		Yes
Water Discharge Report - 2019		
a complaints register, updated monthly;		Yes

the annual reviews of the project;	-
Annual Environmental Monitoring Report 2011	Yes
Annual Environmental Monitoring Report 2012	Yes
Annual Environmental Monitoring Report 2013	Yes
Annual Environmental Monitoring Report 2014	Yes
Annual Environmental Monitoring Report 2015	Yes
Annual Environmental Monitoring Report 2016	Yes
Annual Environmental Monitoring Report 2017	Yes
Annual Environmental Monitoring Report 2018	Yes
any other matter required by the Secretary; and	-
3 Year Environmental Audit	Yes – 2013, 2016 and 2019 audits available
Truck Dispatch Times	Yes
(b) keep this information up-to-date, to the satisfaction of the Secretary.	-

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ATTACHMENT 14

Complaints Register

Environmental Complaints Register

Information received about an Environmental Complaint shall be added to the register. These details shall then be added to a Non Conformance Report Form and actioned via the Non Conformance Procedure.

To be kept for at least 7 yrs Date & Time	Method of Complaint (phone, Face to face)	Details of Complainant	Nature of Complaint	Action taken	Reason for no action (if applicable)	NCAR Report No
28/11/11	**Phone (via EPA)**	[redacted]@environment.nsw.gov.au	**Machinery noise 5.50am**	Investigate source of noise and remind all staff & contractors of DA hours of operation. After investigation, no source of noise was able to be identified		
2/7/12 overnight	**Phone**	[redacted] Nimbin Rd, Blakebrook **6629 3289**	**Bitumen tanker delivering for SAS parked at NRQA gate over night leaving his burners on, creating noise**	Asphalt plant manager visited Mr Wallace to apologize for the disturbance and assure him that it wouldn't happen again, as SAS will no longer be located at NRQA site.		
31/08/12	**Phone**	[redacted]	**Called to notify us that the blast taken at approx 10.00am caused a tremor felt in the house similar to that experienced when lightning strikes in close proximity. Caused windows to rattle.**	Explained that the cause may have been due to cloud cover not allowing pressure wave to dissipate vertically as the weather was overcast forcing the concussion to dissipate laterally. She and her husband would like to have a look around the quarry at some stage if possible; discussed with [redacted] and will try to arrange. [redacted]	**Over pressure sensor readings returned all within parameter.**	

Environmental Complaints Register

Information received about an Environmental Complaint shall be added to the register. These details shall then be added to a Non Conformance Report Form and actioned via the Non Conformance Procedure.

To be kept for at least 7 yrs Date & Time	Method of Complaint (phone, Face to face)	Details of Complainant	Nature of Complaint	Action taken	Reason for no action (if applicable)	NCAR Report No
19/6/15	**Phone**	**Phone call received from [redacted] EPA saying there was a noise complaint from an anonymous neighbour**	**Night work being conducted for RMS road works (Clunes). Anonymous neighbor phoned EPA reporting noise after hours.**	Copy of LCC DA sent to EPA noting Point 8, identifying our right to work during this time		
15/4/16	**Phone**	**Anonymous neighbor**	**Asphalt night works disturbing them (noise)**	Caller did not wish to identify themselves or lodge a formal complaint.		
18/4/16	**Phone**	**Anonymous neighbor**	**Asphalt night works disturbing them (noise)**	Caller did not wish to identify themselves or lodge a formal complaint.		
19/04/2016- 30/04/2016				Nil - No complaints received		
1/05/2016-31/05/2016				Nil- No Complaints received		
1/06/2016- 30/06/2016				Nil- No Complaints received		
1/07/2016 31/07/2016				Nil- No Complaints received		
1/08/2016 – 31/08/2016				Nil - No complaints received		
1/09/2016-30/09/2016				Nil- No complaints received		
01/10/2016-31/10/2016				Nil- No Complaints received		

Environmental Complaints Register

Information received about an Environmental Complaint shall be added to the register. These details shall then be added to a Non Conformance Report Form and actioned via the Non Conformance Procedure.

To be kept for at least 7 yrs Date & Time	Method of Complaint (phone, Face to face)	Details of Complainant	Nature of Complaint	Action taken	Reason for no action (if applicable)	NCAR Report No
01/11/2016 30/11/2016				Nil – No Complaints received		
01/12/2016- 31/12/2016				Nil – No complaints received		
01/01/2017 31/01/2017				**Nil – No Complaints received**		
1/02/2017 28/02/2017				**Nil – No Complaints received**		
1/03/2017 31/10/2017				**Nil – No Complaints received**		
01/04/2017 30/04/2017				**Nil – No Complaints received**		
01/05/2017 31/05/2017				Nil- No Complaints received		
01/06/2017 30/06/2017				Nil- No Complaints received		
01/07/2017 31/07/2017				Nil- No Complaints received		
01/08/2017 31/08/2017				Nil - No complaints received		
01/09/2017 30/09/2017				Nil- No complaints received		
01/10/2017- 31/10/2017				Nil- No Complaints received		
01/11/2017 30/11/2017				Nil- No Complaints received		
01/12/2017				Nil- No Complaints received		

Environmental Complaints Register

Information received about an Environmental Complaint shall be added to the register. These details shall then be added to a Non Conformance Report Form and actioned via the Non Conformance Procedure.

To be kept for at least 7 yrs Date & Time	Method of Complaint (phone, Face to face)	Details of Complainant	Nature of Complaint	Action taken	Reason for no action (if applicable)	NCAR Report No
31/12/2017						
01/01/2018 31/01/2018				Nil – No Complaints received		
01/02/2018 28/02/2018				Nil – No Complaints received		
01/03/2018 31/10/2018				Nil – No Complaints received		
01/04/2018 30/04/2018				Nil – No Complaints received		
01/05/2018 31/05/2018				Nil- No Complaints received		
01/06/2018 30/06/2018				Nil- No Complaints received		
01/07/2018 31/07/2018				Nil- No Complaints received		
01/08/2018 31/08/2018				Nil - No complaints received		
01/09/2018 30/09/2018				Nil- No complaints received		
01/10/2018 31/10/2018				Nil- No Complaints received		
01/11/2018 30/11/2018				Nil- No Complaints received		
01/12/2018 31/12/2018				Nil- No Complaints received		
01/01/2019 31/01/2019				Nil - No Complaints received		
01/02/2019				Nil- No complaints received		

Environmental Complaints Register

Information received about an Environmental Complaint shall be added to the register. These details shall then be added to a Non Conformance Report Form and actioned via the Non Conformance Procedure.

To be kept for at least 7 yrs Date & Time	Method of Complaint (phone, Face to face)	Details of Complainant	Nature of Complaint	Action taken	Reason for no action (if applicable)	NCAR Report No
28/02/2019						
01/03/2019 31/03/2019				Nil- No Complaints received		
01/04/2019 30/04/2019				Nil- No Complaints received		
01/05/2019 31/05/2019				Nil- No Complaints received		
01/06/2019 30/06/2019				Nil- No Complaints received		
01/07/2019 31/07/2019				Nil – No complaints received		
1/08/2019 31/08/2019				Nil – No complaints received		
1/09/2019 30/09/2019				Nil – No complaints received		
1/10/2019 31/10/2019				Nil – No complaints received		
1/11/2019 30/11/2019				Nil – No complaints received		
1/12/2019 31/12/2019				Nil – No complaints received		