Grants Road Sand Quarry
Annual Review

1 January 2019 to 31 December 2019

PROJECT APPROVAL 08_0099

paa DESIGN
architecture
planning
urban design
landscape architecture
Peter Andrews + Associates
PTY LTD

March 2020

Project Summary

Name of Operation	Grants Road Sand Quarry
Name of Operator	Steven Jones
Development consent / project approval #	08_0099
	Modification to the Project Approval dated 4 May 2018
Name of holder of development consent / project approval	GR and AK Jones
Environment Protection Licence	11240
Water licence #	WAL 17474; WAL36455; WAL 17440; WAL 36988; WAL37745; WAL37746
Name of holder of water licence	GR and AK Jones
MOP/RMP start date	25 July 2014
MOP/RMP end date	30 June 2044
Annual Review start date	1 January 2019
Annual Review end date	31 December 2019
Name of authorised reporting officer	Vanessa Colclough
Title of authorised reporting officer	Environmental Planner / Director
Date	30 March 2020

Document History and Status

Project: 19_027

Client: GR & AK Jones - Grants Road Sand Quarry

Version	Date issued	Issue	Author
A	30 March 2020	Annual submission to the Department of Planning, Industry and Environment	Vanessa Colclough

Peter Andrews + Associates Pty Ltd
paa.design architecture planning urban design landscape architecture

PO Box 494 Terrigal NSW 2260
Level 1 . 56 Terrigal Esplanade Terrigal
Studio 67 Windmill Street Millers Point
P::+61 2 4385 9126
E::info@paadesign.com.au
W::www.paadesign.com.au

CONTENTS

APPENDICES

1. Introduction

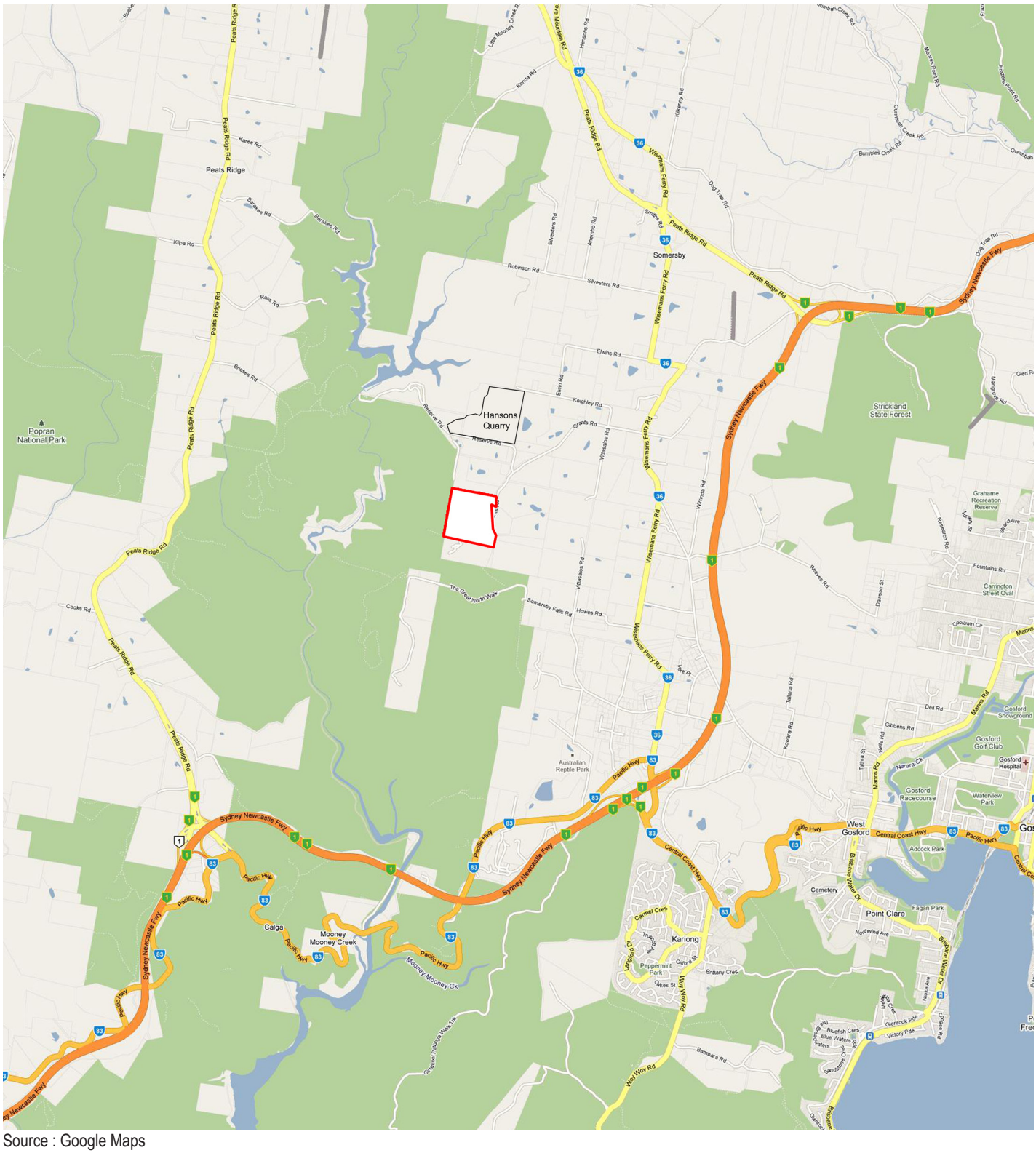
This Annual Review has been prepared for the Grants Road Sand Quarry located at 270 Grants Road, Somersby in accordance with Condition 4 Annual Review of Schedule 5 Environmental Management, Reporting and Auditing of the Project Approval 08_0099 dated 25 July 2014 and the Modification to the Project Approval dated 4 May 2018. The Annual Review is for the period from 1 January 2019 to 31 December 2019 (the reporting period). Figure 1 shows the location and extent of the quarry. The Project Approval is included in Appendix 1 and Notice of Modification in Appendix 2.

The modification to the Project Approval was for the Environmental Assessment of the project titled Section 75W Modification Application for Changes to Biodiversity Offset Area for Approved Grants Road Sand Quarry Extension 270 Grants Road Somersby, dated December 2017 and supplementary ecological survey report titled Additional Ecological Information Report, dated March 2018

This Annual Report provides a review of the activities that have occurred during the reporting period and documents the activities and environmental monitoring undertaken at the Quarry in 2019.

Schedule 5 condition 4 of the Project Approval and Modification requires that an Annual Review be undertaken by the end of March each year to review the environmental performance of the project. The Annual Review must:

> *(a) describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development 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 past 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 EA;*
>
> *(c) identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance;*
>
> *(d) identify any trends in the monitoring data over the life of the project;*
>
> *(e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and*
>
> *(f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the project.*



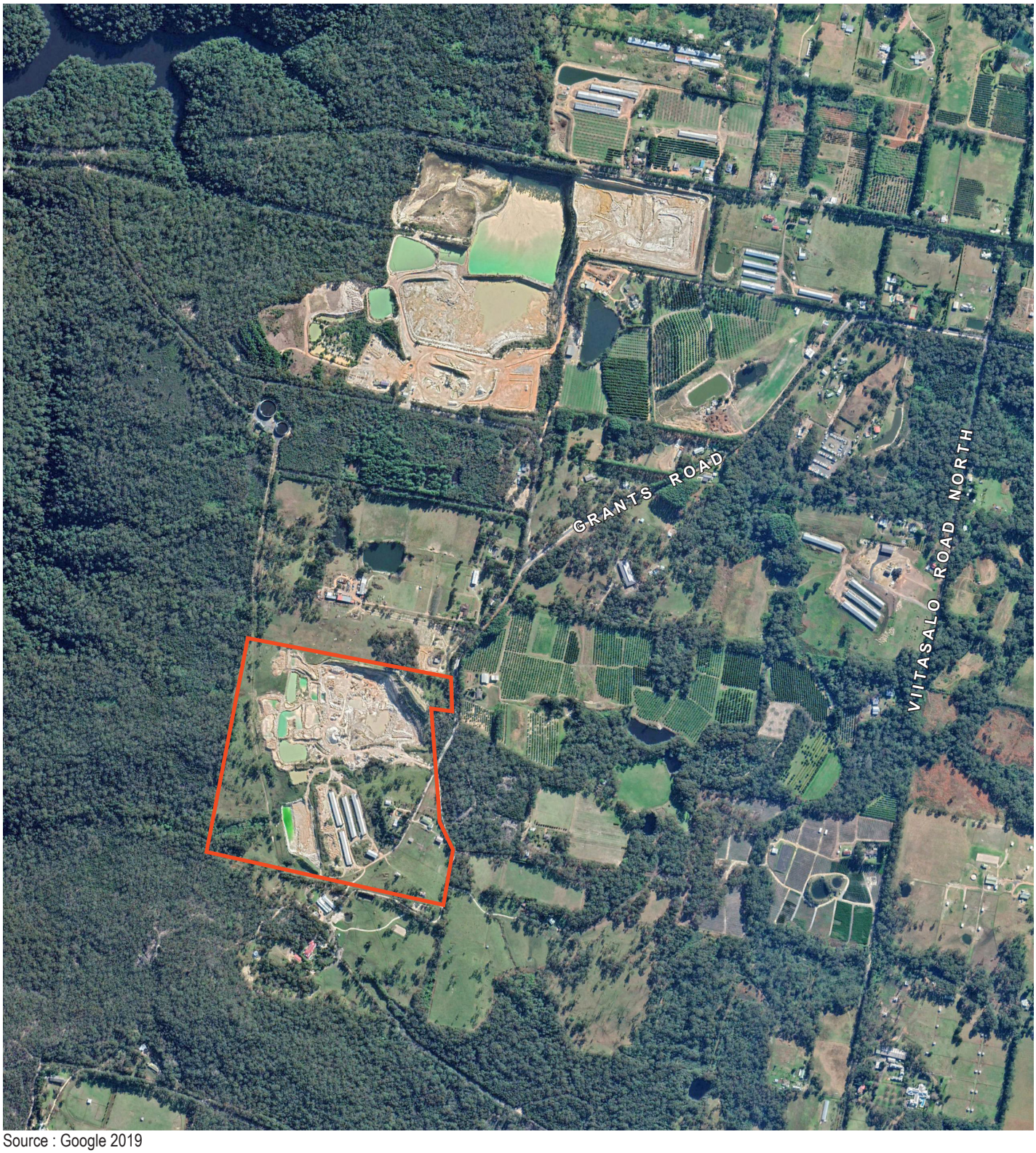
Source : Google Maps

Legend

The Site

North

Figure 1 - Locality Plan



Source : Google 2019

Legend

The Site

North

Figure 2 - Aerial Photograph

2. Performance Requirements

2.1. Management

Grants Road Sand Quarry is under the management of Quarry Manager, Mr. Steven Jones. Whilst, all employees and contractors/suppliers have a responsibility for the effective and ongoing management of environmental impacts at the quarry, the Quarry Manager has specific duties and responsibilities including:

- Day to day implementation of the EMP.
- Ensuring site personnel have undertaken appropriate environmental awareness training and are observing all necessary management requirements.
- Ensure all required environmental auditing/monitoring is undertaken.
- Consultation with relevant stakeholders and complaints handling.

Contact details for any information in regard to the quarry or the operations can be directed as follows:

Quarry Manager – Mr Steven Jones - ph: 0418 116 861
Website - www.grantsrdsand.com.au
Email - info@grantsrdsand.com.au
Address - 270 Grants Road, Somersby NSW 2260

2.2. Hours of operation

The hours of operation for the quarry and for construction activities are:

- Monday to Friday 7.00am to 6.00pm; and
- Saturdays from 7.00am to 1.00pm.

Other activities, e.g. maintenance carried out on site may be conducted outside the above hours if conducted in a manner that is inaudible at all privately-owned residences. The following activities may be carried out on the site outside the above hours:

- Delivery or dispatch of materials as requested by the Police or other authorities; and
- Emergency work to avoid the loss of lives, property and/or to prevent environmental harm.

In such circumstances, the Proponent shall notify the Secretary and affected residents prior to undertaking the activities, or as soon as is practical thereafter. No such circumstances occurred during the reporting period.

2.3. Licences

The Licences held for the quarry during the reporting period are listed in the following table.

Table 1 – Licences

Approval / Licence	Approval / Licence Number	Issue Date	Expiry Date
Project Approval	08_0099	25 July 2014	30 June 2044
Environment Protection Licence	11240	13 October	
Water Licence	WAL 17474	11 December 2012	
Water Licence	WAL36455	1 November 2013	
Water Licence	WAL 17440	24 April 2014	
Water Licence	WAL 36988	13 January 2015	
Water Licence	WAL37745		
Water Licence	WAL37746		

2.4. Approval Requirements

The requirements and compliance under the Project Approval are outlined in Appendix 3 for the project. Additional information regarding the monitoring of the project is outlined in Section 4 of this Annual Review.

3. Activities undertaken during the Reporting Period

3.1. Site Inspection

A site visit and meeting with the Quarry Manager, Steven Jones was carried out on 28 October 2019.

3.2. Activities

The following outlines the key activities undertaken at Grants Road Sand Quarry during the reporting period.

Table 2 – Key Activities

Month	Activities
January	• Updating the website throughout the year with relevant reports. • Weed management undertaken throughout the year. • Maintaining equipment and implementing improvements to machinery to reduce any impacts. •
February	
March	• First bi-annual community consultation meeting held
April	• Submission of the 2018 Annual Report to the Department of Planning, Industry and Environment.
May	
June	
July	
August	
September	• Second bi-annual community consultation meeting held.
October	• Annual report site inspection carried out.
November	• Revised Biodiversity Offset Management and Habitat Rehabilitation Plan as per the Modification submitted to the Department of Planning, Industry and Environment.
December	• Various monitoring undertaken throughout the year for the Annual Review. • Registration of Biodiversity Offset area being undertaken and various correspondence with the Department of Planning, Industry and Environment in regard to same.

Source: Grants Road Sand Quarry 2019

3.3. Quarrying and Extraction

The annual production for the quarry for the period from 1 January 2019 to 31 December 2019 is outlined below.

Table 3 – Production Summary

Material	Approved limit (Project approval MP_00800	Previous reporting (actual)	This report period (actual)	Next reporting period (forecast)
Sand and sandstone products	250,000 tonnes per annum	124 933.33 tonnes	127 705.47 tonnes	130 000 to 150 000 tonnes

4. Environmental Monitoring

Grants Road Sand Quarry engaged the various consultants to undertake the environmental monitoring of the quarry site in accordance with Project Approval 08_0099 and Notice of Modification dated 4 May 2018. The following provides a summary and the environmental monitoring reports are attached in the relevant appendices.

4.1. Water Quality

The Water Quality Monitoring Report including surface water and ground water has been prepared by Larry Cook Consulting Pty Ltd and is attached in Appendix 4.

Water level monitoring is undertaken in four (4) dedicated monitoring bores. Water quality sampling and testing is carried out in two of these monitoring bores and at three surface water monitoring sites. The Water Monitoring Sites are identified in the following table. Regular water sampling was undertaken from 1 January 2019 to 31 December 2019.

Table 4 – Register of Water Monitoring Sites

Monitoring Site	Monitoring Type	Location	Monitoring
W1	Surface Water	North-west discharge point	Water quality
W4	Surface Water	Culvert on south-west waterway	Water quality
S1	Surface Water	South-west waterway on western boundary of Lot1	Water quality
G4 (BH 4)	Groundwater	Bore on NW corner of decant Pond	Water quality and automated water level
G3 (BH 3)	Groundwater	Bore in NW corner of Lot 1 (control bore)	Water quality and automated water level
DDH 1	Groundwater	Northern central part of Lot 1	Automated water level
DDH 2	Groundwater	Southern central part of Lot 1	Automated water level

Summary of the results:

GEOCHEMISTRY

- The pH of the surface water sampled is slightly acidic to slightly alkaline that reflects rainwater recharge over the quarry precinct and potential mixing with local groundwater hosted by the Hawkesbury Sandstone. The recorded pH measurements are within the range of acceptable and agreed discharge levels.
- The concentrations of Total Suspended Solids (TSS) recorded in groundwater samples were at low concentrations or less than the LOR with low to non-detect levels recorded in the surface water samples. Therefore, the recorded TSSs are less than the discharge level limit.
- Low levels of nutrients likely reflect the agricultural history of the district (fertilisers and chicken growing),
- No impacts from current approved quarrying activities on this aquifer system were detected.

WATER LEVEL MONITORING

- The close correlation between rain events and the rise in water levels recorded in shallow monitoring bores suggests relative rapid recharge of the shallow aquifer system, especially in Monitoring Bore BH 3 and to a lesser extent in BH4. This is consistent with the results of extensive groundwater investigations over the Site and surrounding district.
- The hydrographs for the relatively deeper monitoring bores also show a direct response to rainfall events but with a more subdued magnitude.
- No potential impacts from approved quarrying activities on this aquifer system were detected.

4.2. Noise

A site attended noise audit was undertaken of the quarry on 28 November 2019 by Atkins Acoustics and Associates Pty Ltd and is attached in Appendix 5. The results of the audit are as follows.

Site inspections during the audit identified that onsite extraction and processing was established in Areas A and D.

Activities included:

- McClosky (Tricon) Screen and loader in centre portion of Area B.
- Excavator preparation works eastern side Area B.
- Truck loading from stockpile area south-western portion Area A.
- Saw cutting central lower portion of Area A.
- Sand Washing Plant Area A
- Dam maintenance Area D

Site inspection and attended noise audits were conducted between 7.10am and 11.45pm on Thursday 28 November 2019. Weather observations and conditions reported at the Mangrove Mountain (ID 061375) weather station during the audit were calm to light east to north-east wind (0–2.5m/sec), air temperature 15-25 degrees Celsius, relative humidity 29–98% and clear sky.

The site attended sound pressure level measurements were conducted at three (3) locations selected to represent the residential receivers identified in Grants Road Sand Noise Management Plan.

The reference measurement locations are:

- Location 1: 'Ibels' - 380 Somersby Falls Road
- Location 2: 'McGregor' - 239 Grants Road
- Location 3: 'Sammut' - 210 Grants Road
- Location 4: 'National Park' Boundary

The noise measurement instrumentation selected comprised a SVAN949 Sound and Vibration Analyzer. Measurements were conducted over fifteen (15) minute periods, noise sources identified and measured during the audit where appropriate were used to assess source noise contributions from the Grants Road Sand Quarry operations. A summary of the measurement results and calculated contributions are outlined in the following table.

Table 5 – Audit Measurement Results – November 2019

Measured Ambient Sound Pressure Levels dBA				Grants Road Sand Contribution	Comments
L_{Aeq}	L_{A10}	L_{A90}	L_{A1}	$L_{Aeq, 15min}$*	
Location 1: Ibels Residence – 380 Somersby Falls Road					
48.1	47.5	32.7	58.1	<40	Bees, birds, distant road traffic, GRS mobile plant audible at times estimated LAmax 34/6dBA.
40.3	43.5	33.2	49.2	<40	Aircraft, birds, GRS mobile plant audible at times estimated LAmax 36/7dBA.
Location 2: McGregor Residence – 239 Grants Road					
41.2	45.1	33.8	50.9	<40	Aircraft, birds, GRS onsite trucks LAmax 35/4dBA, FEL loader audible at times.
41.6	42.4	32.9	52.4	<40	Aircraft, Distant road traffic, GRS onsite trucks LAmax 34/5dBA, FEL loader audible at times.
Location 3: Sammut Residence – 210 Grants Road					
39.1	40.9	34.4	48.2	<40	Distant road traffic, birds, GRS onsite trucks LAmax 35/8dBA, FEL LAmax 30/2dBA audible at times, Dozer track noise LAmax 30/3dBA.
38.4	40.2	32.4	49.6	<40	Birds, GRS onsite trucks, LAmax 40/2dBA.
Location 4: National Park					
42.4	43.8	38.6	47.9	<50	GRS Hyundai excavator (LAeq 38dBA).
41.7	42.9	38.0	48.5	<50	GRS Hyundai excavator (LAeq 38dBA) .

Onsite measurements were also conducted to confirm sound power levels for the plant and equipment.

The audit measurements have confirmed that operational noise contributions from Grants Road Sand Quarry operations satisfies the *Approval 08_0099.MOD1* dated April 2018 project noise goal LAeq,15min 40dBA and the Noise Management Plan's recommended limit for the National Park LAeq,15min 50-55.

4.3. Air Quality

Baseline air quality and meteorological reporting has been undertaken for the site by ERM Australia Pacific Pty Ltd and is attached in Appendix 6. All monitoring for air quality is conducted in accordance with the NSW Environmental Protection Agency (EPA).

The automatic weather station (AWS) and High Volume Air Sampler (HVAS) are located onsite and are used to provide the baseline monitoring for the quarry site.

The dominant winds for the annual period were from the west. The average wind speed for the period was 2.0 m/s and the percentage occurrence of calm wind conditions (less than or equal to 0.5 m/s) was 1.7 %. June was the coldest month on average with January the hottest month on average. A maximum daily average of 29°C was recorded on 31 December 2019. January recorded the highest monthly rainfall of 31 mm.

The results for the available data in 2019 are of a possible sixty samples (over approximately 12 months), forty-six samples are reported, resulting in a data recovery rate of approximately 77%. The average PM_{10} concentration over the recorded 12-month period was 14.6 µg/m3, which is below the annual EPA impact assessment criterion of 25 µg/m3. All reported results are below the EPA maximum 24-hour average criterion of 50 µg/m3 for PM_{10}, except for the maximum 24-hour average of 276 µg/m3 recorded on 4 December 2019. This was attributed to the extreme bushfire activity experienced across the NSW region.

Dust deposition is measured at two locations, R1 and R4. Of a possible 12 samples, 12 samples are reported for both sites. The average monthly dust deposition level for the period of 2019 was 0.7 g/m2/month at R1 and 0.8 g/m2/month at R4. The results for R1 are all below the EPA cumulative annual average criterion of 4 g/m2/month. Only one value at R4 was above the criterion. The maximum values of 3.6 g/m2/month and 4.2 g/m2/month were both recorded in December, and both most likely attributed to the intense bushfire activity during December 2019. All other recorded levels were below 1.5 g/m2/month and the annual averages were well below the 4 g/m2/month criterion.

The dust sample collected by the deposition gauges includes both dust generated by site activities (incremental dust impact) and dust from all other local sources (background dust levels). Even with the background levels accounted for, the deposition levels are considerably below both the incremental and cumulative annual criteria.

A crystalline silica measurement was taken on 3 December 2019, during a period of maximum throughput. The sample was measured over a period of 8 hours on a dozer operating at the site. The mass of sample collected on the filter was 15 µg. Based on a sample flow rate of 2.75 L/min, this equates to 11.4 µg/m3 over an 8-hour period. Average levels over a 24-hour period would be lower and lower again over a year (annual average).

A crystalline silica content of 17% of PM_{10} was used for the air quality assessment in 2013 (PAEHolmes, 2013), and using the measured 2019 annual average PM_{10} concentration of 14.6 µg/m3 would therefore equate to approximately 2.5 µg/m3. However, it is noted that only the respirable fraction of PM_{10} is relevant for assessing respirable crystalline silica, that is, PM_4. If it is conservatively assumed that 50% of PM_{10} is $PM_{2.5}$, then the inferred annual average respirable crystalline silica concentration might be approximately 1.25 µg/m3, significantly below the annual criterion of 3 µg/m3.

4.4. Groundwater Dependent Ecosystems

A review of the Groundwater Dependent Ecosystems management protocol was undertaken by Conacher Consulting and is attached in Appendix 7.

Groundwater dependent ecosystem condition was monitored through sampling of both qualitative and quantitative variables. The following variables were measured:

i. *Native Plant Composition*
Plot surveys were completed comparing the results of the baseline plot monitoring results from the 2018 monitoring period with the current plot conditions. The native flora species present and projected foliage cover were assessed. Comments are provided for the species observed, including GDE species, which are reliant on moist soil conditions.

ii. *Exotic Plant Composition*
All exotic flora species and total cover of exotic flora species were recorded for each plot.

iii. *GDE Extent and Distribution*
Mapping of GDE's was informed by aerial photograph analysis and interpretation using Nearmap imagery dated 18 December 2019.

iv. *Vegetation Photo Point Monitoring*
Photographs were taken for each monitoring quadrat from each cardinal point.

v. *Surface Erosion and Sedimentation Monitoring*
A visual inspection of the downstream and downslope GDE patches from the quarry site was undertaken to monitor for any surface erosion or sedimentation impacts from the quarry operations.

vi. *Comparison with Groundwater Monitoring Data*
For the current monitoring period there was significant adverse species composition or distribution changes within the GDEs. Some browning of vegetation, particularly *Gleichenia microphylla,* however this is considered to be related to hot and dry weather experienced during spring and early summer directly prior to monitoring.

The review of the Groundwater Dependent Ecosystems concludes that all performance targets have been met for GDEs and requirement for mitigation or response measures has not been triggered in relation to 2019 site operations.

4.5. Somersby Mintbush Monitoring

The 2019 annual monitoring report for Somersby Mintbush *Prostanthera junonis* has been prepared by Conacher Consulting and is attached in Appendix 8.

Counts of flowering *P. junonis* plants were undertaken on 22 November 2019 and 27 December 2019 and at each of the Somersby Mintbush subpopulation locations adjacent to the quarry allotment identified by NSW NPWS (2000). The results of the counts are provided in Table 6.

Table 6 – Somersby Mint Bush Cumulative Count Results

Sub-Population Number	2015 Count Results	2016 Count Results	2017 Count Results	2018 Count Results	2019 Count Results
3	0	2 flowering plants (several non-flowering juvenile regrowth plants observed)	18 flowering plants	42 flowering plants	29 flowering plants
4	0	No flowering plants. Several non-flowering juvenile plants observed	34 flowering plants	394 flowering plants	484 flowering plants

An assessment of the project performance indicators and responses required is provided in Table 2.2. (Refer Appendix 8, Somersby Mintbush). Physical disturbance of vegetation likely by a machine was observed on the eastern extent of Somersby Mintbush Sub-population 3, between the Mintbush outer limits and the quarry site fence. There are no quarry works occurring within the vicinity of the observed disturbance. The disturbance area was detected after the flowering season surveys had concluded on 13 February 2020. It is not known whether any plants have been impacted or the source of the disturbance. The details of the noncompliance maters and responses are provided in Table 7.

Table 7 – Somersby Mint Bush Compliance Assessment for 2019 monitoring period

Trigger Levels	Other Disturbances		Population Decline	
	Trigger	Response	Trigger	Response
2019 Monitoring Period Results	Disturbance event observed, source not known	Report to GRSQ Report to DPIE Include in animal report Determine if attributable to the project and implement improved operational procedures and offsets if necessary	Population increase observed at SP4 during flowering period Decrease in flowering plants detected at SP3 of 31% during flowering period	Reduced counts during flowering period do not appear to be attributable to the project Natural shading is increasing due to regenerating shrub cover Very dry weather conditions also experienced during 2019 Report to DPIE

The report concludes:

i. An increase in the sub-population 4 of Somersby Mintbush was recorded compared to the previous monitoring period.

ii. The Somersby Mintbush population increase recorded is likely a result of reduced shading and regeneration following the 2015 hazard reduction burning operations of the NPWS.

iii. A decrease in the sub-population 3 of Somersby Mintbush was recorded compared to the previous monitoring period. The number of plants observed flowering is still greater than the 2017 and 2016 monitoring periods.

iv. Physical disturbance of vegetation, likely by a machine, was observed on the eastern extent of Somersby Mintbush Sub-population 3. It is not known whether any plants have been impacted or the source of the disturbance.

v. The responses identified in Table 2.2 should be implemented.

vi. Suitable environmental controls should continue to be maintained for the Project and signposting of Somersby Mintbush sub-population 3 should be undertaken.

Noting the recommendation for signage, Grants Road Sand Quarry would not be able to construct and place a sign within the National Park. It is therefore suggested that Grants Road Sand Quarry place a sign on its boundary fence in the general vicinity of the Sub-population 3. The sign would face out to the National Park advising that the immediate area is known to have a population of Somersby Mintbush.

4.6. Landscape and Rehabilitation Monitoring

The review of the landscape and rehabilitation activities has been prepared by Conacher Consulting and is included in Appendix 9. An initial Landscape and Rehabilitation Plan (LRMP) for the project was approved on 11 December 2015. Since the preparation of this LRMP, the Biodiversity Offset Areas and Landscape Buffer Areas for the project have been revised through an approved Modification Application (No 1).

A revised Landscape and Rehabilitation Management Plan (LRMP) (Conacher Consulting Version 2 - 2019) and a new Biodiversity Offset Management & Habitat Rehabilitation Plan (Conacher Consulting November 2019) have been prepared to meet the current project approval and commitment requirements. These new documents have been forwarded to the Department of Planning, Industry and Environment and have been approved by the Department.

The following works have been completed in accordance with the Biodiversity Offset Strategy requirements for the project:

- Management of fauna nest boxes.
- Fencing of Biodiversity offset areas.

The long-term security of the offset is currently being addressed by Stephen Thorne and Associates Surveyors. The Department of Planning, Industry and Environment have been provided with the following documents:

- Plan of Positive Covenants and Restrictions on the use of Land within Lots 1 and 2 DP 358717
- Draft Section 88B Covenant
- Draft Deposited Plan Administration Sheet
- Revised Landscape and Rehabilitation Management Plan (November 2019)
- Biodiversity Offset Area and Habitat Rehabilitation Plan (November 2019) to reflect the modified Biodiversity Offset Strategy.

A requirement for rehabilitation works has not been triggered during the 2019 monitoring period.

The Project is compliant with the requirements of the current Landscape and Rehabilitation Management Plan and Biodiversity Offset Management & Habitat Rehabilitation Plan prepared in compliance with the Conditions for Modification 1 of the Project Approval.

The progressive implementation of these plans is being undertaken as required.

The current Landscape and Rehabilitation Management Plan and Biodiversity Offset Management and Habitat Rehabilitation Plan documents have been revised in 2019 and no revisions are recommended this stage. Any revisions required as a result of the Department of Planning, Industry and Environment's initial review of these documents can be completed separately to the annual review process.

4.7. Heritage

The fence was constructed around the Grants Road RE1 Aboriginal Site and the initial monitoring of the site was undertaken in 2015. Monitoring is required to be undertaken every five (5) years and will be undertaken in 2020.

The monitoring of Howes Reserve in conjunction with the Grants Sand site was undertaken as per the CHMP requirement. A visual inspection was undertaken in three main areas – the main area of engravings to the south east, the exposed for sheet to the south west including the vertical engraving on the rock shelf face, and the rock shelf to the north side of Howes Reserve.

Other inspections will be undertaken once biodiversity works are required

The inspection of Howes Reserve did not find any evidence, such as rockshelf cracking, displacement or scouring due to dust deposition. At the time of inspection, it had rained, and it is evident that natural sheet erosion of the sandstone rock shelves and wash from the access road through the reserve, have produced some sand that washes over the lower lying sites. Refer to Heritage report at Appendix 10.

Biodiversity offsets
There has been no activity (i.e.. ground disturbance works) in the biodiversity offset area that has required a cultural heritage inspection in 2019

Complaints
There have been no complaints regarding cultural heritage in this period.

4.8. Community Consultation

Meetings of the Community Consultations Committee (CCC) were held on 28 March 2019 and 5 September 2019 at Somersby Garden Estate. Refer to minutes of CCC meetings at Appendix 11.

No community complaints were received.

Following resignation of one of the community representatives from the committee, new community representatives are to be recruited.

4.9. Visual

An earth and sound mound have been constructed in the north eastern area of the quarry site by Grants Road Sand Quarry. This mound has been vegetated using existing grasses located on the site to minimise visual impact. This vegetation is to be continuously maintained.

4.10. Waste Management

All waste generated is managed appropriately and no on-site disposal of general waste occurs. Grants Road Sand Quarry is also committed to reducing, reusing and recycling prior to disposal of waste.

The quarry site also is permitted to accept VENM and ENM. The quarry has received 11 245.3 tonnes of geotechnical certified VENM and 5667.24 tonnes of ENM during January to December 2019.

4.11. Bushfire

Bushfire management of the quarry site is implemented by the Quarry Manager including maintaining the site and the onsite water cart is set up for firefighting purposes and also able to provide onsite water for fire brigade tankers. The Quarry Manager is also an active member of the Somersby Rural Fire Service.

5. 2020 Reporting Period

The following identifies the measures and activities that are proposed to be undertaken during the 2020 calendar year.

General

- Maintaining equipment and implementing improvements to machinery to reduce any impacts.
- Research and applying best practice in quarry management.
- Updating of the website to include additional environmental reporting and relevant data from the quarrying activities.

Water Quality

- Continue acquisition and charting of water level measurements in the network of four groundwater monitoring bores.
- Make repairs to the groundwater monitoring sites and reinstate the installed water level data loggers.
- Carry out regular routine surface water and groundwater monitoring in the monitoring network during 2020 in accordance with the requirements documented in the surface water and groundwater management plans. This includes maintenance and make repairs to pressure sensors to maintain integrity and communications.
- Reinstate oil and grease testing at surface water sample site S1 at the frequency of one sample per month when discharge occurs.
- Submit water samples to the project laboratory (ALS) for analysis, compile results and assess any trends and exceedances and, if required, implement a response and action plan in accordance with the environmental management plans.
- Prepare a report giving the results of the 2020 monitoring program and an assessment of any trends and potential impacts. This will include an ongoing assessment of hydrographs, pH, TSS, nitrogenous compounds and other tests as required.

Noise Quality

- Implement best management practice to minimise the construction, operational and road noise of the project.
- Assess the noise monitoring data and relocate, modify or stop operations on site to ensure compliance.
- Maintain the effectiveness of noise suppression equipment on plant and equipment on site.
- Minimise the noise impacts of the project during certain meteorological conditions.
- Include the continuation of the earth mounding/bunding on the north-eastern, northern and western site boundaries.
- Additionally, and dependent on product demand, it is expected that the depths of the working platforms (Areas A and B) could increase by 3-4 metres.

Air Quality

- Current mitigation processes are to be sustained.
- Monitoring for air quality to be conducted in accordance with the NSW Environmental Protection Agency.
- Quarterly monitoring for crystalline silica.
- Preparation of the Annual report.

Biodiversity

Groundwater Dependent Ecosystem

- Detailed monitoring and reporting of the Groundwater dependent ecosystems.

Somersby Mintbush

- Further counts of the previously identified locations of *P. junonis*.
- Continuation of suitable erosion and sedimentation controls and maintenance.
- The trigger levels will be utilised in future monitoring to improve and assess performance for the Project in relation to Somersby Mintbush. Additional monitoring items should be added to the list in the future if deemed necessary. None of these identified triggers have occurred during the current monitoring period.

Landscape and Rehabilitation

- Works within the bio offset area subject to approval of the Landscape and Rehabilitation Plan.
- Annual reporting.

Heritage

- Consultation with the Aboriginal Land Councils through the preparation of newsletters updating on activities of the Quarry.
- Inspection of biodiversity area subject to any works being undertaken.
- Monitoring of the Grants Road REI Aboriginal site.

Community Consultation

- Undertake community consultative committee meetings biannually.

Waste Management and Minimisation

- Ensuring best practice is implemented throughout the quarry site.

Visual Impact

- Maintaining and improving the vegetation on the mound constructed in the north eastern portion of the site.
- Maintaining and improving the site where appropriate.

Bushfire Management

- Ensuring bushfire management practices are implemented.

6. Community + Complaints

6.1. Complaint Management

The quarry has not received any complaints during the reporting period. The Community Consultative Committee has been established and has agreed to meet biannually in March and September.

7. Trends

7.1. Trends in the monitoring data

Trends in monitoring data identified to date for the quarry expansion are outlined in the following table:

Table 8 – Trends in Monitoring Data

Key Issue	Trends
Noise	Noise contributions have remained steady.
Somersby Mint Bush	Continuing regrowth of *P. junonis* was observed at subpopulation 4.

7.2. Discrepancies between the predicted and actual impacts of the project

There have been no discrepancies identified.

Appendix 1
PROJECT APPROVAL 08_0099

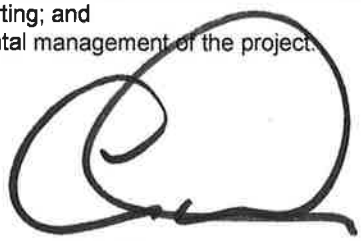
Project Approval

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

As delegate for the Minister of Planning, I approve the project application referred to in Schedule 1, subject to the conditions in Schedules 2 to 5.

These conditions are required to:

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



Chris Wilson
Executive Director
Development Assessment Systems & Approvals

Sydney 25 July 2014

SCHEDULE 1

Application Number:	08_0099
Proponent:	GR and AK Jones
Approval Authority:	Minister for Planning
Land:	Lot 1 DP358717
Project:	Grants Road Sand Quarry Extension

TABLE OF CONTENTS

DEFINITIONS

Annual Review	The review required by condition 3 of schedule 5
BCA	Building Code of Australia
Biodiversity Offset Strategy	The conservation and management of the Proponent's offset sites on Lot 1 DP358717
CCC	Community Consultative Committee
Conditions of this approval	Conditions contained in Schedules 2 to 5 inclusive
Council	Gosford City Council
Department	Department of Planning and Environment
DRE	Division of Resources and Energy (within the Department of Trade and Investment, Regional Infrastructure and Services)
EA	Environmental Assessment of the project titled *Grants Road Sand Quarry Extension - Environmental Assessment Report* prepared by Peter Andrews and Associates, dated April 2013; and the Proponent's response to the issues raised in submissions, dated December 2013
Environmental Consequences	The environmental consequences of quarrying operations, including erosion, sedimentation and adverse impacts on water quality, water quantity and biodiversity
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPL	Environment Protection Licence issued under the POEO Act
Feasible	Feasible relates to engineering considerations and what is practical to build or carry out
GDEs	Groundwater Dependent Ecosystems
High Priority GDEs	GDEs listed in Schedule 5 of the *Water Sharing Plan for the Kulnura Mangrove Mountain Groundwater Sources 2003*, including *Hawkesbury Coastal Banksia Woodland* and *Sandstone Hanging Swamps*
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
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
Minor	Not very large, important or serious
Mitigation	Activities associated with reducing the impacts of the project
Negligible	Small and unimportant, such as to be not worth considering
NOW	NSW Office of Water
OEH	Office of Environment and Heritage
POEO Act	*Protection of the Environment Operations Act 1997*
Privately-owned land	Land that is not owned by a public agency or a mining or quarrying company (or its subsidiary)
Project	The project as described in the EA, including existing quarrying operations and disturbance
Proponent	GR and AK Jones or any person who seeks to carry out the approved project under this approval
Public Infrastructure	Linear and related infrastructure that provides services to the general public, such as roads, railways, water supply, drainage, sewerage, gas supply, electricity, telephone, telecommunications etc.
Quarrying operations	The extraction, processing and transportation of extractive materials on the site and the associated removal of vegetation, topsoil and overburden

Reasonable	Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Rehabilitation	The restoration of land disturbed by the project to a good condition and for the purpose of establishing a safe, stable and non-polluting environment
RMS	Roads and Maritime Services
Secretary	Secretary of the Department, or nominee
Site	The land described in Schedule 1
Statement of Commitments	The Proponent's commitments in Appendix 1
VENM	Virgin Excavated Natural Material and/or Excavated Natural Material

SCHEDULE 2
ADMINISTRATIVE CONDITIONS

OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT

1. In addition to meeting the specific performance criteria established under this approval, the Proponent shall implement all reasonable and feasible measures to prevent and/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 shall carry out the project generally in accordance with the:
   (a) EA;
   (b) Statement of Commitments; and
   (c) conditions of this approval.

   Note: The statement of commitments is reproduced in Appendix 1.

3. If there is any inconsistency between the above documents, the more 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 shall comply with any reasonable 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;
   (b) any reviews, reports or audits undertaken or commissioned by the Department regarding compliance with this approval; and
   (c) the implementation of any actions or measures contained in these documents.

LAPSING OF APPROVAL

5. If the project has not been physically commenced within 5 years of the date of this approval, then this project approval shall lapse.

LIMITS ON APPROVAL

Quarrying Operations

6. The Proponent may carry out quarrying operations on the site until 30 June 2044.

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

Production Limit

7. The Proponent shall not extract process and transport more than 250,000 tonnes of quarry products from the site in any calendar year.

SURRENDER OF EXISTING DEVELOPMENT CONSENT

8. By the end of December 2015, or as otherwise agreed by the Secretary, the Proponent shall surrender all existing development consents that it holds for the site in accordance with Section 104A of the EP&A Act.

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

9. Prior to the surrender of this development consent, the conditions of this approval shall prevail to the extent of any inconsistency with the conditions of that consent.

STRUCTURAL ADEQUACY

10. The Proponent shall 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 the proposed building works; and*
- *Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.*

DEMOLITION

11. The Proponent shall 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

12. The Proponent shall:
    (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.

OPERATION OF PLANT AND EQUIPMENT

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

UPDATING AND STAGING OF STRATEGIES, PLANS OR PROGRAMS

14. To ensure that strategies, plans and 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.

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

Notes:

- *While any strategy, plan or program may be submitted on a staged basis, the Proponent will need to ensure that the existing operations on site 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.*
- *For the avoidance of doubt, existing approved management plans, strategies or monitoring programs for the Grants Road Sand Quarry will continue to apply until the approval of a similar plan, strategy or program under this approval (see condition 8 above).*
- *See also condition 5 of Schedule 5.*

PRODUCTION DATA

15. The Proponent shall:
    (a) provide annual quarry production data to DRE using the standard form for that purpose; and
    (b) report this data in the Annual Review (see condition 4 of Schedule 5).

IDENTIFICATION OF APPROVED EXTRACTION LIMITS

16. By 30 September 2014, unless otherwise agreed with the Secretary, the Proponent shall:
    (a) engage a registered surveyor to mark out the boundaries of the approved limits of extraction within the entire site; and
    (b) submit a survey plan of these boundaries with applicable GPS coordinates to the Secretary.

17. While quarrying operations are being carried out, the Proponent shall ensure that these boundaries are clearly marked at all times in a manner that allows operating staff to clearly identify the approved limits of extraction.

SCHEDULE 3
ENVIRONMENTAL PERFORMANCE CONDITIONS

SOIL AND WATER

Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Proponent is required to obtain the necessary water licences for the project, including in respect of the extraction and/or interception of groundwater.

Water Supply

1. The Proponent shall 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.

Compensatory Water Supply

2. The Proponent shall provide a compensatory water supply to any owner of a privately-owned groundwater bore where monitoring indicates that the project is causing (or contributing to, in conjunction with another quarry project) a reduction in pumping yield of more than 10%, or a 2 metre decline in the water table, in consultation with NOW, and to the satisfaction of the Secretary.

   The compensatory water supply measures must provide an alternative long-term supply of water that is equivalent to the loss attributed to the project. Equivalent water supply must be provided (at least on an interim basis) within 24 hours of the loss being identified.

   If the Proponent and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

   If the Proponent is unable to provide an alternative long-term supply of water, then the Proponent shall provide alternative compensation to the satisfaction of the Secretary.

Pollution of Waters

3. Unless an EPL authorises otherwise, the Proponent shall comply with section 120 of the POEO Act during the carrying out of the project.

Water Management Plan

4. The Proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Secretary. This plan must:
   - (a) be prepared by suitably qualified person(s), approved by the Secretary;
   - (b) be prepared in consultation with NOW, and be submitted to the Secretary for approval by the end of November 2014; and
   - (c) 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;
         - reporting procedures; and
       - measures that would be implemented to minimise clean water use on site;
     - (ii) Surface Water Management Plan, that includes:
       - detailed baseline data on surface water flows and quality in water bodies that could potentially be affected by the project;
       - a detailed description of the water management system on site, including the:
         - clean water diversion system;
         - erosion and sediment controls;
         - dirty water management system; and
         - water storages;
       - a program to monitor and report on surface water flows and quality in water bodies that could potentially be affected by the project; and

- a comparison of monitoring results with modelled predictions;

(iii) Groundwater Management Plan, that includes:

- detailed baseline data on groundwater levels, yield and quality in local sandstone aquifers, privately-owned groundwater bores and in areas of high priority GDEs that could be affected by the project;
- groundwater impact assessment criteria for local sandstone aquifers, privately-owned bores and high priority GDEs;
- a program to monitor and report on:
  - groundwater inflows to the quarrying operations;
  - the impacts of the project on:
    - local sandstone aquifers;
    - privately-owned groundwater bores; and
    - high priority GDEs,

  including provision for continuous groundwater monitoring; and
- a program to validate the groundwater model for the project, and comparison of monitoring results with modelled predictions;
- a protocol, developed in consultation with Central Coast Sands Quarry, to appropriately apportion responsibility for any potential impacts to privately-owned groundwater bores and/or high priority GDEs that may be affected cumulatively by the project and operations at Central Coast Sands Quarry;
- an investigation of opportunities to maintain ecosystem function in high priority GDEs to the west and northwest of the project through facilitating run-on of clean surface waters; and

(iv) a Surface and Ground Water Contingency Strategy, that includes:

- a protocol for the investigation, notification and mitigation of identified exceedances of the surface water and groundwater impact assessment criteria;
- measures to mitigate and/or compensate potentially affected landowners of privately-owned land, including provision of alternative long-term supply of water to the affected landowner that is equivalent to the loss attributed to the project; and
- the procedures that would be followed if any unforeseen impacts are detected during the project.

Note: In the event that there is a dispute between the Proponent and Central Coast Sands Quarry concerning the development, finalisation or implementation of the above protocol, then either party may refer the matter to the Secretary for resolution. The decision of the Secretary on the matter shall be final.

NOISE

Hours of Operation

5. The Proponent shall only conduct construction activities and quarrying operations on the site:
   (a) between 7.00 am and 6.00 pm, Monday to Friday;
   (b) between 7.00 am and 1.00 pm, Saturday; and
   (c) at no time on Sunday or public holidays.

   Note: The Proponent may carry out other activities e.g. maintenance, on the site provided that these activities are conducted in a manner that is inaudible at all privately-owned residences.

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

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

Noise Impact Assessment Criteria

7. The Proponent shall ensure that the construction and operational noise generated by the project does not exceed the criteria in Table 1 at any residence on privately-owned land.

Table 1: Noise criteria

Receiver Location	***$L_{Aeq\ (15\ min)}$ dB(A)***
All privately-owned residences	40

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 2 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 1 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 the agreement.

Operating Conditions

8. The Proponent shall:
   (a) implement best management practice to minimise the construction, operational and road noise of the project;
   (b) regularly assess noise monitoring data and relocate, modify and/or stop operations on site to ensure compliance with the noise criteria in this approval;
   (c) maintain the effectiveness of noise suppression equipment on plant and equipment on site;
   (d) minimise the noise impacts of the project during meteorological conditions under which the noise limits in this approval do not apply (see Appendix 2); and
   (e) carry out regular noise monitoring to determine whether the project is complying with the relevant conditions of this approval,

   to the satisfaction of the Secretary.

Noise Management Plan

9. The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Secretary. This plan must:
   (a) be prepared in consultation with the EPA, and submitted to the Secretary for approval by the end of November 2014;
   (b) describe the measures that would be implemented to ensure:
      - compliance with the relevant conditions of this approval;
      - best management practice 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;
   (c) describe the proposed noise management system; and
   (d) include a monitoring program that:
      - uses attended monitoring to evaluate the compliance of the project against the noise criteria in this approval;
      - evaluates and reports on the effectiveness of the noise management system and the best practice noise management measures; and
      - defines what constitutes a noise incident at the project, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.

AIR QUALITY

Air Quality Impact Assessment Criteria

10. The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the project do not exceed the criteria listed in Tables 2, 3, 4 and 5 at any residence on privately-owned land.

Table 2: Long-term criteria for particulate matter

Pollutant	***Averaging Period***	***[d] Criterion***
Total suspended particulate (TSP) matter	Annual	[a] 90 µg/m^3

Particulate matter < 10 µm (PM_{10})	Annual	[a] 30 µg/m^3

Table 3: Short-term criteria for particulate matter

Pollutant	***Averaging Period***	***[d] Criterion***
Particulate matter < 10 µm (PM_{10})	24 hour	[a] 50 µg/m^3

Table 4: Long-term criteria for deposited dust

Pollutant	***Averaging Period***	***Maximum increase in deposited dust level***	***Maximum total deposited dust level***
[c] Deposited dust	Annual	[b] 2 g/m^2/month	[a] 4 g/m^2/month

Table 5: Impact assessment criterion for crystalline silica

Pollutant	***Averaging Period***	***Criterion***
[e] Chronic Reference Exposure Level (REL) (PM_4)	Annual	3 µg/m^3

References to Tables 2 to 5:

[a] Total impact (ie. incremental increase in concentrations due to the project plus background concentrations due to all other sources);

[b] Incremental impact (ie. incremental increase in concentrations due to the project on its own);

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

[d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Secretary in consultation with the EPA; and

[e] Crystalline silica must be analysed in accordance with a test method approved by the Department of Health.

Operating Conditions

11. The Proponent shall:
    (a) implement best practice management to minimise the dust emissions of the project;
    (b) regularly assess 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 5);
    (d) implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site; and
    (e) minimise the area of surface disturbance and maximise progressive rehabilitation of the site; and
    (f) carry out regular air quality monitoring to determine whether the project is complying with the relevant conditions of this approval,

    to the satisfaction of the Secretary.

Air Quality Management Plan

12. The Proponent shall prepare and implement an Air Quality Management Plan for the project to the satisfaction of the Secretary. This plan must:
    (a) be prepared in consultation with the EPA and submitted to the Secretary for approval by the end of November 2014;
    (b) describe the measures that would be implemented to ensure:
        - compliance with the relevant 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; and
    (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;
- effectively supports the air quality management system; and
- evaluates and reports on the adequacy of the air quality management system.

METEOROLOGICAL MONITORING

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

TRANSPORT

Monitoring of Product Transport

14. The Proponent shall:
    (a) keep accurate records of the:
        - amount of quarry products transported from the site (per calendar month and year); and
        - number of laden vehicle movements from the site (per hour, day, week, calendar month and year); and
    (b) publish these records on its website biannually.

Operating Conditions

15. The Proponent shall ensure that:
    (a) all project-related heavy vehicles enter and exit the site in a forward direction;
    (b) all laden vehicles entering or leaving the site have their loads covered; and
    (c) all laden vehicles leaving the site are cleaned of sand and other material that may fall on the road, before leaving the site.

Grants Road Maintenance

16. The Proponent shall, in conjunction with the operator of the Central Coast Sands Quarry, cause to be prepared a road condition assessment and road maintenance contributions study of Grants Road. The study must:
    (a) be undertaken by a suitably qualified, experienced and independent person(s) endorsed by the Secretary;
    (b) be undertaken in consultation with Council;
    (c) be submitted to the Secretary for approval by the end of March 2015;
    (d) be co-funded by the Proponent and the operator of the Central Coast Sands Quarry on a basis which is proportionate to the maximum number of tonnes of quarry product expected to be dispatched from each quarry over the life of their major project approvals, and the length of Grants Road affected by laden vehicles from each quarry;
    (e) assess current road condition of the length of Grants Road affected by laden vehicles from each quarry, and future road maintenance requirements for this length of road over the life of the major project approvals for both quarries;
    (f) give consideration to the usage of Grants Road by laden vehicles from each quarry over the past five years and the predicted usage of Grants Road by laden vehicles from each quarry over the life of their major project approvals, including any importation of VENM; and
    (g) recommend per tonne/per kilometre road maintenance contributions for the project for the haulage of quarry products and VENM on Grants Road.

    If the Proponent and the operator of the Central Coast Sands Quarry cannot agree on any aspect of undertaking this study or the implementation of its recommendations, then either party may refer the matter to the Secretary for resolution. The decision of the Secretary on the matter shall be final.

17. The Proponent shall pay contributions to Council for the maintenance of Grants Road, in accordance with the study required under condition 16, unless otherwise agreed by the Secretary.

Traffic Management Plan

18. The Proponent shall prepare and implement a Traffic Management Plan for the project, to the satisfaction of the Secretary. This plan must:
    (a) be submitted to the Secretary for approval by the end of November 2014;
    (b) include a drivers' code of conduct to minimise the impacts of project-related trucks on local residences and road users; and
    (c) describe the measures that would be put in place to ensure compliance with the drivers' code of conduct.

BIODIVERSITY

Biodiversity Performance Measures

19. The Proponent shall ensure that the project does not cause any exceedances of the performance measures in Table 6, to the satisfaction of the Secretary.

Table 6: Biodiversity impact performance measures

Feature	***Measure***
High priority GDEs located within 1 kilometre of extraction operations	Minor environmental consequences, including: • negligible erosion of the surface of the GDEs; • negligible sedimentation within the GDEs; • minor changes in the size of the GDEs; • no significant change to the composition or distribution of species within the GDEs.
Somersby Mintbush	Negligible environmental consequences

Offsets

20. If the Proponent exceeds the performance measures in Table 6 and the Secretary determines that:
    (a) it is not reasonable or feasible to remediate the impact or environmental consequence; or
    (b) remediation measures implemented by the Proponent have failed to satisfactorily remediate the impact or environmental consequence;
    then the Proponent shall provide a suitable offset to compensate for the impact or environmental consequence, to the satisfaction of the Secretary.

    Note: Any offset required under this condition must be proportionate with the significance of the impact or environmental consequence.

Groundwater Dependent Ecosystem Monitoring and Management Program

21. The Proponent shall undertake additional studies on the high priority GDEs located within 1 kilometre of extraction operations under the approval and potentially impacted by the project. The studies shall be undertaken in consultation with NOW and include:
    (a) a description of the nature and extent of groundwater reliance for each GDE;
    (b) long-term monitoring of the condition of the GDEs;
    (c) performance indicators for project-related environmental consequences on GDEs and trigger levels to initiate mitigation/response measures; and
    (d) mitigation/response measures to ensure minor environmental consequences on the GDEs,
    to the satisfaction of the Secretary.

Somersby Mintbush Monitoring and Management Program

22. The Proponent shall prepare and implement, in consultation with OEH and Council, a Somersby Mintbush (*Prostanthera junonis)* Monitoring Program within the vicinity of the site. This program must include:
    (a) a baseline assessment of the extent and condition of the Somersby Mintbush populations before commencement of quarrying operations under the approval;
    (b) long-term monitoring of these populations;
    (c) establishment of performance indicators for project-related environmental consequences on Somersby Mintbush and trigger levels to initiate mitigation/response measures; and

(d) mitigation/response measures to ensure negligible environmental consequences on the Somersby Mintbush,

to the satisfaction of the Secretary.

Biodiversity Offset Strategy

23. The Proponent shall implement the biodiversity offset strategy described in the EA, as summarised and revised in Table 7, and shown conceptually in Appendix 3, to the satisfaction of the Secretary.

Table 7: Summary of the biodiversity offset strategy

Area	***Offset Criteria***	***Size (hectares)***
On-site Offset Area	Existing vegetation to be enhanced to establish: • at least 4 ha of moderate – good quality Scribbly Gum Woodland and/or another native vegetation community commensurate with the local surroundings; and • suitable habitat for threatened fauna species including the provision of at least 36 nest boxes.	6.37

Note: See condition 26 for additional requirements relating to the management of the biodiversity offset strategy.

Long Term Security of Offset

24. The Proponent shall make suitable arrangements to provide appropriate long-term security for the offset areas prior to the commencement of extraction operations under this approval unless otherwise agreed by the Secretary, to the satisfaction of the Secretary.

LANDSCAPE

Rehabilitation Objectives

25. The Proponent shall rehabilitate the site to the satisfaction of the Secretary. This rehabilitation must be generally consistent with the rehabilitation strategy in the EA, and comply with the objectives in Table 8.

Table 8: Rehabilitation objectives

Feature	***Objective***
Site (as a whole)	• Safe, stable and non-polluting. • Minimise the visual impact of the final landforms as far as is reasonable and feasible.
Surface Infrastructure	• To be decommissioned and removed, unless the Secretary agrees otherwise.
Quarry Benches	• Suitably landscaped and revegetated using native species.
Quarry Pit Floor	• Establish land with a level of at least Class 4 agricultural suitability over 80% of the quarry floor.
Community	• Ensure public safety. • Minimise the adverse socio-economic effects associated with quarry closure.

Progressive Rehabilitation

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

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

Landscape and Rehabilitation Management Plan

27. The Proponent shall prepare and implement a Landscape and Rehabilitation Management Plan for the site, including the offset area, to the satisfaction of the Secretary. This plan must:
    (a) be prepared by suitably qualified person(s) whose appointment has been approved by the Secretary;
    (b) be prepared in consultation with OEH, DRE and Council, and submitted to the Secretary for approval by the end of July 2015;
    (c) describe how the implementation of the biodiversity offset strategy would be integrated with the overall rehabilitation of the site;
    (d) describe the short, medium, and long term measures that would be implemented to:
        - manage the remnant vegetation and habitat on the site and in the offset areas;
        - implement the biodiversity offset strategy; and
        - ensure compliance with the rehabilitation objectives and the progressive rehabilitation obligations in this approval;
    (e) include detailed performance and completion criteria for evaluating the performance of the biodiversity offset strategy and the rehabilitation of the site, including triggers for any necessary remedial action;
    (f) include a detailed description of the measures that would be implemented over the next 3 years (to be updated for each 3 year period following initial preparation of the plan), including the procedures to be implemented for:
        - enhancing the quality of remnant vegetation and fauna habitat;
        - landscaping the site and along public roads to minimise visual and lighting impacts;
        - restoring native endemic vegetation and fauna habitat;
        - maximising the salvage of environmental resources within the approved disturbance area – including tree hollows, vegetative and soil resources – for beneficial reuse;
        - ensuring minimal environmental consequences for threatened species, populations and habitats;
        - minimising the impacts on native fauna, including undertaking pre-clearance surveys;
        - controlling weeds and feral pests;
        - controlling erosion;
        - controlling access; and
        - bushfire management;
    (g) include a program to monitor the effectiveness of these measures, and progress against the performance and completion criteria;
    (h) identify the potential risks to the implementation of the biodiversity offset strategy and rehabilitation of the site, and include a description of the contingency measures that would be implemented to mitigate these risks; and
    (i) include details of who would be responsible for monitoring, reviewing and implementing the plan.

Conservation and Rehabilitation Bond

28. The Proponent shall lodge a Conservation and Rehabilitation Bond with the Department within 6 months of the approval of the Landscape and Rehabilitation Management Plan, 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. The sum of the bond shall be determined by:
    (a) calculating the cost of implementing the biodiversity offset strategy over the next 3 years;
    (b) calculating the cost of rehabilitating 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 conservation and biodiversity bond.*
    - *If capital and other expenditure required by the Landscape and Rehabilitation Management Plan is largely complete, the Secretary may waive the requirement for the lodgement of a bond in respect of the remaining expenditure.*

- *If the rehabilitation of the site area is completed to the satisfaction of the Secretary, then the Secretary will release the bond. If the rehabilitation of the site is 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.*

29. Within 3 months of each Independent Environmental Audit (see condition 9 of Schedule 5), the Proponent shall review, and if necessary revise, the sum of the Conservation and Rehabilitation Bond to the satisfaction of the Secretary. This review must:
    (a) consider the performance of the implementation of the rehabilitation of the site to date;
    (b) consider the effects of inflation; and
    (c) calculate the cost of rehabilitating the disturbed areas of the site (taking into account the likely surface disturbance over the next 3 years of quarrying operations.

HERITAGE

Heritage Management Plan

30. The Proponent shall prepare and implement an Aboriginal Cultural Heritage Management Plan for the project to the satisfaction of the Secretary. This plan must:
    (a) be prepared by suitably qualified person(s) whose appointment has been approved by the Secretary;
    (b) be prepared in consultation with OEH and local Aboriginal stakeholders;
    (c) be submitted to the Secretary for approval by the end of November 2014;
    (d) include a description of the measures that would be implemented for:
        - protecting, monitoring and managing Aboriginal sites within the site, including the biodiversity offset strategy;
        - maintaining and managing reasonable access for Aboriginal stakeholders to cultural heritage items on site and in the biodiversity offset areas;
        - managing the discovery of any human remains or previously unidentified Aboriginal objects on site, including (in the case of human remains) stop work provisions and notification protocols;
        - ongoing consultation with the local Aboriginal stakeholders in the conservation and management of Aboriginal cultural heritage both on-site and in the biodiversity offset areas;
        - ensuring any workers on site receive suitable heritage inductions prior to carrying out any activities which may disturb Aboriginal sites, and that suitable records are kept of these inductions; and
        - the long term management of the Aboriginal cultural heritage values of the site post extraction operations and rehabilitation of the site.

VISUAL

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

31. The Proponent shall:
    (a) vegetate any earthen perimeter bund at the project within 3 months of establishing the bund, using appropriate flora species to minimise the visual and off-site sedimentation impacts of the project; and
    (b) maintain this vegetation in a good condition throughout the remainder of the project,
    to the satisfaction of the Secretary.

WASTE MANAGEMENT

32. The Proponent shall:
    (a) minimise and monitor the waste generated by the project;
    (b) ensure that the waste generated by the project is appropriately stored, handled and disposed of;
    (c) manage on-site sewage treatment and disposal in accordance with the requirements of Council; and
    (d) report on waste management and minimisation in the Annual Review,
    to the satisfaction of the Secretary.

33. Prior to importing any VENM to the site, the Proponent must obtain a 'resource recovery exemption' under the POEO Act and provide evidence of this approval to the Department.

DANGEROUS GOODS

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

BUSHFIRE

35. The Proponent shall:
    (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 as much as possible if there is a fire in the vicinity of the site.

SCHEDULE 4
ADDITIONAL PROCEDURES

NOTIFICATION OF LANDOWNERS

1. As soon as practicable after obtaining monitoring results showing:
   (a) an exceedance of any relevant criteria in Schedule 3, the Proponent shall notify the affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the project is again complying with the relevant criteria; and
   (b) an exceedance of any relevant air quality criteria in Schedule 3, the Proponent shall 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 shall:
   (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.

SCHEDULE 5
ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Secretary. The strategy must:
   (a) be submitted to the Secretary for approval by the end of November 2014;
   (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 that would 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.

Management Plan Requirements

2. The Proponent shall 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;
      - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;
   (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
   (d) a program to monitor and report on the:
      - impacts and environmental performance of the project;
      - 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.

Adaptive Management

3. 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, at the earliest opportunity:

(a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not reoccur;
(b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and
(c) implement remediation measures as directed by the Secretary,

to the satisfaction of the Secretary.

Annual Review

4. By the end of March each year, or other timing as may be agreed by the Secretary, the Proponent shall review the environmental performance of the project to the satisfaction of the Secretary. This review must:
   (a) describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development 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 past 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 EA;
   (c) identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance;
   (d) identify any trends in the monitoring data over the life of the project;
   (e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and
   (f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the project.

Revision of Strategies, Plans and Programs

5. Within 3 months of the submission of an:
   (a) annual review under condition 4 above;
   (b) incident report under condition 7 below;
   (c) audit report under condition 9 below; or
   (d) any modification to the conditions of this approval,

   the Proponent shall review the strategies, plans and programs required under this approval, to the satisfaction of the Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted for the approval of the Secretary.

   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.

Community Consultative Committee

6. If directed by the Secretary, the Proponent shall establish and operate a Community Consultative Committee (CCC) for the project to the satisfaction of the Secretary. Any such CCC must be operated in general accordance with the *Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects* (Department of Planning, 2007, or its latest 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 Department's guideline, the CCC should be comprised on an independent chair and appropriate representation from the Proponent, Council (if available) and the local community.*
   - *This CCC can be combined with any other CCC established under conditions of consent or approval for State Significant quarry developments on the Somersby Plateau.*

REPORTING

Incident Reporting

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

Regular Reporting

8. The Proponent shall 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.

AUDITING

Independent Environmental Audit

9. By 30 June 2015 and every 3 years thereafter, unless the Secretary directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must:
   (a) be 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;
   (c) assess the environmental performance of the project and assess whether it is complying with the 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; and
   (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.

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

10. Within 6 weeks of completion of this audit, or as otherwise agreed by the Secretary, the Proponent shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.

ACCESS TO INFORMATION

11. By the end of November 2014, the Proponent shall:
   (a) make copies of the following publicly available on its website:
      - the documents referred to in condition 2 of Schedule 2;
      - all 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, and the Proponent's response to the recommendations in any audit;
      - minutes of CCC meetings;
      - any other matter required by the Secretary; and

   (b) keep this information up to date,

   to the satisfaction of the Secretary.

APPENDIX 1
STATEMENT OF COMMITMENTS

Subject	Commitments	Timing
1. General Arrangements	The development shall be carried out in accordance with the Environmental Assessment (April 2013) prepared by Peter Andrews + Associates Pty Ltd and this Addendum Report. This Addendum Report will override the Environmental Assessment where there is an inconsistency.	Ongoing
2. Staging	Staging of the development will be in accordance with the staging of works set out in the Environmental Assessment (April 2013).	Ongoing
3. Statutory Requirements	Obtain and maintain all relevant approvals and licences.	As required and continuous
	Comply with all conditional requirements in all approvals and licences.	As required
4. Hours of Operation	7.00am to 6.00pm Monday to Friday 7.00am to 1.00pm Saturday	Ongoing
5. Reporting Requirements	Undertake monitoring for the key areas as identified below.	As required
	Incorporate relevant data/monitoring information in the Annual Reports.	Annually
	Incorporate the management measures into the Environmental Management Plan. The development is to operate at all times within the terms and conditions of the Environmental Management Plan.	Prior to commencement and subject to five yearly reviews
	Update procedures manual for the operation of the quarry with regards to the quarry expansion including the following and ensure all staff are aware of procedures. • Operation of plant and equipment • Environmental monitoring • Restrictions imposed on quarrying • Vegetation removal • Sedimentation and erosion • Transportation	Prior to commencement of the operations
	Provision of the annual production data to the Department of Trade and Investment	Annually
6. Soils and Land capability	Locate areas for acoustic earth mounds.	Prior to topsoil stripping operations
	Maintain topsoil for rehabilitation and minimise soil loss through erosion.	Ongoing
	Vegetate all mounds with Kikuyu grass	As required
	Implement downslope sedimentation controls as required	Until the surface of the mounds are vegetated
7. Groundwater	Undertake automatic water level measurements in water level data logger in monitoring bores	Initially 4-hourly samples. Assess data after 12 months and depending on the results, decrease frequency to 8-hourly samples
	Undertake groundwater sampling in representative monitoring bores	Initially 3 monthly. Assess data after 12 months and depending on the results, decrease frequency to 6

Subject	Commitments	Timing
		monthly samples
	Undertake automatic rainfall measurements in tipping bucket rain gauge data logger on site	Continuous logging at every 0.2mm tip with time/date stamps.
	Preparation of the Groundwater Management Plan, which incorporates the development of a water level and water quality monitoring program and the development of a set of trigger levels and mitigation measures if adverse impacts occur on the environmental and/or neighbouring water users.	Within 6 months of the project approval
	Provide a complete set of results of the production and monitoring program including a review and assessment of the statistical analysis to the *Senior Hydrogeologist NOW* and the quarry owner.	Annually
	Communicate with any landowner if there is a scientifically and independently demonstrated significant impact on any neighbouring water users surrounding the site.	As required
8. Surface Water	Preparation of an Environmental Management Plan for the quarry extension based on a continuation of the current environmental management and mitigation measures for the quarry expansion as outlined in the current EMP.	Prior to the commencement of the quarry operations
	Construct earth bunds and surface water diversion banks and drains around the perimeter of the entire quarry pit void. Bunds and/or diversion drains will require ongoing minor realignments as the quarry pit develops and advances especially through zone 'C'. Bunds can be designed as 'multi-purpose' to provide additional public 'Highwall' safety in addition to surface water flow management.	Prior to the commencement of the quarry operations and ongoing
	Relocate the chicken farming operations storage shed that is currently located on the south west drainage path to the south of the site and bund the storage site to contain runoff while chicken farming is ongoing at the site.	Prior to the commencement of the quarry operations and ongoing
	Construct 'out of pit' containment infrastructure in the south-eastern most section of the property boundary adjacent to Zone E to capture and passively treat contaminated surface water runoff whilst simultaneously providing additional water security. Infrastructure to consist of: 1. One 10 Megalitres (ML) Pollution Control Dam (PC Dam) to receive nitrogen rich runoff from Zones F&G where the existing chicken and machinery sheds are located. This dam will gravity flow via a spillway into a shallow polishing pond. Control structures such as rock 'rip rap' or similar will be required to control water runoff velocity prior to entering the PC Dam. 2. Broad shallow polishing pond/s will receive any water spilled or transferred from PC Dam and provide passive treatment through suitable wetland plant species. 3. Pipeline and pumps for transfer of water each way between the in-pit decant pond and out of pit PC Dam. 4. A floating siphon in the PC Dam to maintain a 5 ML operating level. Ensure PC Dam and pond are located outside of the water pipeline easement and located generally as shown on the plans. Access to the ponds will be along the southern boundary across the water pipeline easement.	Prior to the commencement of the quarry operations and ongoing
	Continue monitoring of surface water at locations W1 and W4	Monitor until stage 2 of the quarry commences.

	After construction of the control pond and polishing pond, it is proposed that the quality of the treated quarry discharge released to the south west waterway is monitored at the future surface water quality monitoring location S1 shown in Appendix 2 of this report. Initially, the control pond and polishing dam will be used mainly to treat runoff from the chicken farming operations, the existing dwelling and a small area of pasture, and will only be used to treat water captured within the quarry during large rainfall events until the commencement of stage 2 of the quarry. As the quarry extends to the maximum quarry footprint in stage 2, pumping out of the quarry may occur as regularly as weekly. Undertake water quality monitoring by a grab sample taken during discharge downstream of the control pond and polishing pond at location S1 on a monthly basis. The parameters will be monitored and compared against the proposed discharge limits as follows: • Suspended solids 40mg/L • Oil and grease – 5 and/or none visible • pH – 6.0-8.0	Monthly water monitoring
9. Biodiversity and Environmental Management	Identify the boundaries of the quarry.	Prior to clearing of vegetation
	Preparation of a detailed Biodiversity Offset Management and Habitat Rehabilitation Plan for areas to be retained as biodiversity offsets within the site.	Prior to the clearing of vegetation
	Biodiversity offsetting will be undertaken to compensate for unavoidable impacts to biodiversity within the site including the removal of 1.5 hectares of Cleared Land with Remnant Trees vegetation and the loss of 18 hollow bearing trees. The areas within the site proposed for biodiversity offsetting are located in the north-eastern section of the site and along the western section of the site. The offsetting strategy proposed will result in the improvement and maintenance of biodiversity values on the site for the medium to long term. A total of 7.1 hectares of land will be retained and managed as a biodiversity offset to compensate for the loss of 1.5 hectares of Cleared Land with Remnant Trees vegetation. Offset areas will be protected in perpetuity and subject to a 10 year rehabilitation and maintenance period. The areas proposed for retention comprise the following: • 0.85 hectares of Disturbed Scribbly Gum Woodland; • 3.5 hectares of Cleared Land with Remnant Trees Vegetation; and • 2.75 hectares of Cleared Land. The areas proposed for offsetting will be subject to protective fencing to exclude livestock and local populations of feral Rusa Deer, intensive replanting of endemic tree and shrub species within cleared areas and weed management of noxious and environmental weeds. A total of 170 hollow-bearing trees will be retained and 36 nest boxes will be erected to compensate for the loss of 18 hollow bearing trees.	The first 10 years of Stage 2
	All hollow-bearing trees to be removed are to be inspected and sectionally dismantled by an arborist, under the supervision and direction of an ecologist. Where possible, escaped fauna is to be caught by the consulting ecologist and transported to a suitable release area. If juvenile or injured fauna are encountered they are to be captured and transported to a wildlife carer or a veterinary surgeon as required. In the case where the arborist declares a tree or stag unsafe to climb, machine removal with a rotating grab or similar will be required.	Prior to removal of the hollow-bearing trees

10. Noise	Incorporate noise reducing measures (upgraded exhausts, enclosures/panels to engines, or localised plant specific shielding*) to achieve the following noise reductions: • Dozer 4db; • Trencor 3dB; • McCloskey 3dB; and • Sandwash Plant 8dB for air cooled 6 cylinder engine* (Smaller 4 cylinder engine is now operating with a purpose designed enclosure and exhaust resulting in an 8dB reduction and does not require further attenuation). All reversing alarms replaced with level varying or broadband "quacker" type alarms.	Prior to the use of the plant equipment.
	Plant and equipment to be maintained to ensure acoustic performance is not de-rated and complies with the recommended limits outlined in the Noise Impact Assessment (NIA) and incorporating the specified noise controls.	Throughout the life of the quarry.
	A Site Operational Management Plan (SOMP) be developed to ensure that the dozer, Trencor and McCloskey do not operate simultaneously.	Throughout the life of the quarry.
	Provision of an earth mounds 3-4 metres high along the southern and south-eastern quarry boundaries as shown on Figure 14 of the Environmental Assessment before commencing Precincts E, F and G.	Prior to quarrying of stage 2.
	The SOMP to document procedures to maximise site shielding and minimise number of plant and equipment on exposed locations, particularly on the eastern and southern portions of the quarry (areas B, C, F and G). That is, where practical and feasible only one (1) item of plant would operate at an exposed level (<8m below ground level) at any one time and extraction to proceed against a working face where practical.	During quarrying of the stage 2.
	A site weather station will be installed and continually monitor ambient weather conditions including wind speed and direction at a height of ten (10) metres above ground level. The current weather conditions would be utilised to manage day to day quarry operations, and the SOMP incorporate strict protocols including: • Cease operations within Precinct F and G during north-north-west or west wind conditions up to 3m/s with respect to the operation of the dozer, Trencor and McCloskey in exposed locations (<8m below ground level); and • Utilise periods of high winds >5m/s (particularly east and south-east winds) and/or rain with elevated background noise levels to extract material within exposed locations (Areas B, F and G).	During quarrying of the relevant precincts.
	A Complaints Management Procedure (CMP) be prepared to deal with any noise complaints as follows and include: • Site contact telephone number during business hours to lodge complaints or seek additional information (and message service for out of hours). If phone unattended it should divert to mobile phone of site quarry manager; • Log to record compliant including time of alleged noise issue, duration, description of noise, prevailing weather conditions and complainants contact details; • Complaints to be responded to in a timely manner. Where the noise is currently occurring, Quarry Manager shall investigate and determine noise source is noise is likely to be exceeding Approval Noise Limits. If exceedance is occurring, operations to be amended or ceased; • Audits at sensitive receiver locations to identify noise contributions, compliance and determine if additional procedures or controls to minimise noise from the site are required; • A record of noise investigations to be maintained on site and complainants informed of outcomes of investigations and actions implemented following any noise complaints; and • All site plant including trucks to be regularly inspected and maintained to ensure that the equipment is operating in accordance with specifications and satisfied the noise limits referenced in the NIA (min Annually).	Prior to the commencement of the quarry extensions.

	Undertake an Annual Noise monitoring program that incorporates: • Site attended noise measurements at the three (3) reference locations and record aural observations, statistical noise levels (LA90, LAeq), weather conditions and quarry operations. Typically measurement considering of two (2) 15 minute measurement periods at each receiver; • Attended nearfield or midfield measurements to confirm operating noise levels and determine sound power levels of individual plant and equipment for comparison with source noise data utilised in the EIS Noise Impact Assessment; • Assessment of noise audit measurement results against Conditions of Consent and any pending Licence to determine compliance; • Provide recommendations for ameliorative or management measures for Quarry operator where noise exceedances are identified; • Preparation of Annual Noise Monitoring Report for submission to Consent Authority and/or EPA.	Annually
11. Air Quality	Preparation of an air quality management plan incorporating PM_{10} monitoring at the most affected off-site sensitive location.	Annually
	Minimise dust impacts at sensitive residences through the following onsite management procedures. These procedures to meet the KPIs outlined in this report and be reviewed. • Water of unsealed roads; • Use of wheel-wash and operation of sealed road from wheel-wash to the front gate; • Covering of loads during hauling; • Water of stockpiles when necessary; • Limiting vehicle speed onsite; and	Annually
	• Limiting the area of disturbed land and progressive rehabilitation of completed areas.	
	Carry out campaign monitoring for respirable crystalline silica. The monitoring would assess the exposure of quarry workers to respirable crystalline silica (in accordance with Australian Standard (AS 2985-2009) - Workplace atmospheres - Method for sampling and gravimetric determination of respirable dust.	First year of the quarry extension (on a day of maximum throughput). Monitoring to be repeated quarterly in the first year and if more than two consecutive results demonstrate low risk, monitoring would be discontinued.
	Incorporate greenhouse gas reduction measures for the operation of the project including: • Opportunities to increase energy efficiency will be continuously reviewed including opportunities to minimise haul distances for quarry material, ensuring trucks are fully loaded to maximise productivity and efficiency, reducing trips by coordinating delivery and removal of materials. • Consideration of the use of alternative fuels where economically and practically feasible. • Regular maintenance of diesel powered equipment to ensure operation at peak efficiency. • Consideration of energy efficiency for all electrical equipment, appliances, lighting and hot water system.	Throughout the life of the quarry
12. Roadworks and Traffic Management	All vehicles leaving the site with loads of extracted material are to be sufficiently covered to prevent windblown dust.	Ongoing
13. Heritage	Grants Rd RE1 and RE2 sites are to be preserved.	Continuous
	Incorporate a ten (10) metre buffer on the southern, eastern and western boundary of the anthropomorphic figure (Grants Rd RE1).	For the life of the quarry

	The bund wall for the quarry extension in the area of Grants Rd RE1 to be constructed of block wall rather than earth in between the engraving and the boundary.	Prior to the quarrying of Precinct C
	The engraving (Grants Rd RE1) is incorporated into the monitoring programme currently in place for the adjacent Howes Aboriginal Reserve.	Five yearly
	A protective fence is constructed 8 metres around each side of the Grants Rd RE 1 site to prevent inadvertent damage. The fence should incorporate appropriate signage to ensure the access within the fenced zone is limited to maintenance activities such as grass cutting.	Prior to the quarrying of Precinct C
	Traffic is to be directed around the small mundoe at the Grants Rd RE 2 site to ensure minimal disturbance.	Continuous
	An additional monitoring site visit be undertaken to review the recommendations effectiveness to protect the site.	12 months after the project approval
	The quarry operator to develop and implement an Aboriginal Cultural Heritage Induction Program for all personnel associated with the quarry operations. A register is to be kept off staff/contractors that have been inducted.	Prior to the commencement of the quarry extensions
	Should any materials suspected of being of Aboriginal occupation origin be located during the quarry operations that work cease in that location immediately and that the Office of Environment & Heritage be contacted immediately.	For the life of the quarry
14. Visual Impact	Vegetate all stockpiles and the acoustic earth mounds using appropriate species noting that the current conditions of consent requires the use of Kikuyu grass for the stabilisation of stockpiles.	For the life of the quarry
	Maintain grass covered mounds.	For the life of the quarry
	Maintain the site.	For the life of the quarry
	Keep the site clean and tidy where possible.	Continuous
	Progressively revegetate all areas where quarrying is completed.	Upon completion of quarrying in a precinct
15. Bushfire Protection	Provision of an on-site mobile water pump and tank, with firefighting hose connections to be located on site.	For the life of the quarry
	Management of the site to provide a defendable space to the bushfire hazard. These areas are to be regularly inspected and maintained by the landowners.	For the life of the quarry
16. Waste Management	Keep the site clean and tidy where possible	For the life of the quarry
	Ensure all general waste / garbage is removed by a licensed waste collection contractor at least on a weekly basis.	Continuous
	Preparation of a waste management plan for the demolition of any structures.	Prior to demolition.
17. Mine Rehabilitation	Ensure completed areas of the quarry are revegetated to reduce sedimentation and erosion and dust emissions and visual impact.	As required
	Preparation of a quarry rehabilitation plan to identify staging for rehabilitation.	Within five years of commencement of the quarry extension
	A detailed decommissioning plan will be prepared as part of the review of the Environmental Management Plan.	Towards the end of the life of the Quarry (two years prior)
	A five year monitoring program to be implemented upon completion of the rehabilitation.	Five years after the rehabilitation.

APPENDIX 2
NOISE COMPLIANCE ASSESSMENT

Applicable Meteorological Conditions

1. The noise criteria in Table 2 is to apply under all meteorological conditions except the following:
   a) during periods of rain or hail; or
   b) wind speeds greater than 3 m/s measured at 10 m above ground level.

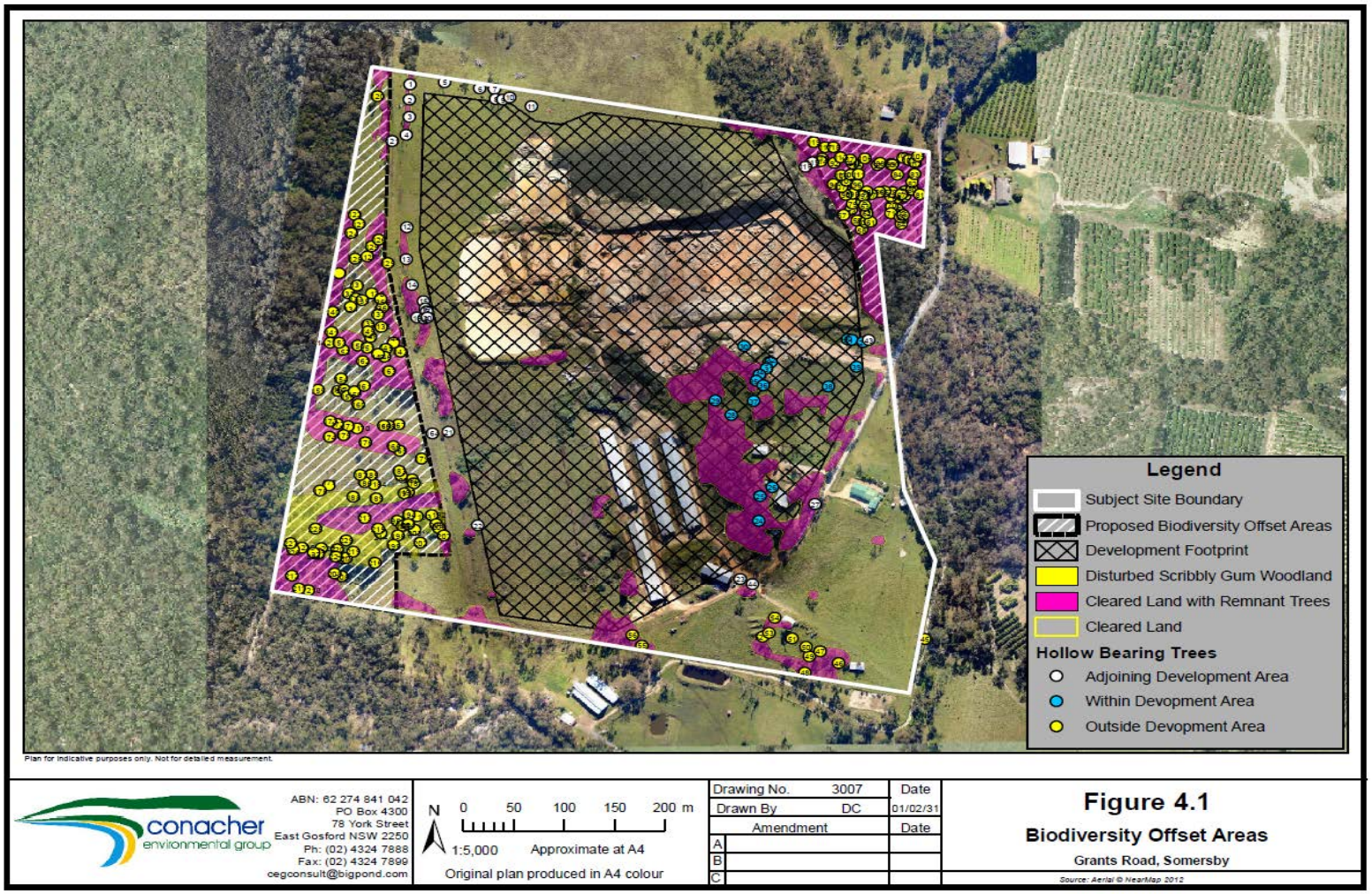
Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions shall be that recorded by the meteorological station in the vicinity of the site.

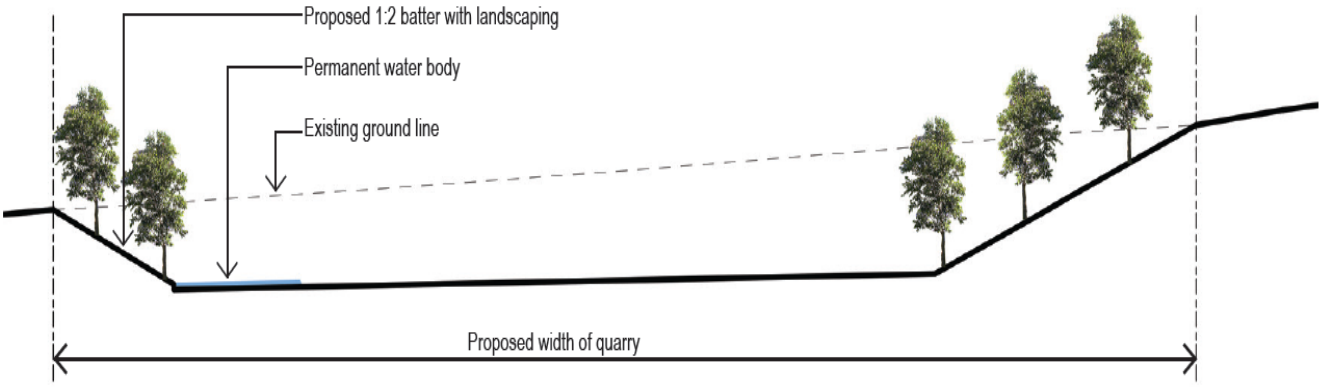
Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this approval.
4. Unless otherwise agreed with the Secretary, 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) meteorological conditions during which the collection of noise data is not appropriate;
   c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
   d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.

APPENDIX 3
BIODIVERSITY OFFSET STRATEGY



APPENDIX 4
CONCEPTUAL FINAL LANDFORM



Appendix 2
NOTICE OF MODIFICATION

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.

Howard Reed

Howard Reed
Director
Resource Assessments

Sydney 04 May 2018

SCHEDULE 1

Project approval 08_0099 for the Grants Road Sand Quarry, granted by the Executive Director Development Assessment Systems & Approvals, as delegate of the Minister for Planning, on 25 July 2014.

SCHEDULE 2

1. In Schedule 1, replace "Lot 1 DP358717" with "Lot 1 and 2 DP358717".

2. In the list of definitions, delete the terms "Biodiversity Offset Strategy", "Council", "DRE", "NOW", "Project" and "Secretary", and their definitions, and insert the following terms and definitions in alphabetical order:

Biodiversity Offset Strategy	The conservation and management of the Proponent's offset sites on Lot 1 and 2 DP358717, as shown in Appendix 3
Council	Central Coast Council
DoI Water	Department of Industry - Water
DRG	Division of Resources and Geoscience in the Department
EA (MOD 1)	Environmental Assessment of the project titled *Section 75W Modification Application for Changes to Biodiversity Offset Area for Approved Grants Road Sand Quarry Extension 270 Grants Road Somersby,* dated December 2017 and supplementary ecological survey report titled *Additional Ecological Information Report*, dated March 2018
Feasible	Means what is possible and practicable in the circumstances
Landscape buffer areas	The buffer areas as shown in Appendix 3
Modification 1	The modifications to the project as described in EA (MOD 1)
Project	The project as described in the documents in condition 2 of Schedule 2, as well as quarrying operations and disturbance existing on the site as at 25 July 2014
Secretary	Planning Secretary under the EP&A Act or nominee

3. Delete all references to "shall" and replace with "must", except in conditions 3, 5 and 9 of Schedule 2, the note to condition 4 of Schedule 3 and the final sentence of condition 16 of Schedule 3.

4. Delete all references to "DRE" and replace with "DRG".

5. Delete all references to "NOW" and replace with "DoI Water".

6. Delete all references to "biodiversity offset strategy" and replace with "Biodiversity Offset Strategy".

7. In condition 1 of Schedule 2:
   (a) after the words "specific performance", insert the words "measures and"; and
   (b) delete the words "and/or minimise any" and replace with ", if prevention is not reasonable or feasible, minimise any material".

8. In condition 2 of Schedule 2, delete sub-paragraphs (b) and (c) and replace with:

   (b) EA (MOD 1); and
   (c) Statement of Commitments.

9. Following condition 2 of Schedule 2, insert the following:

   2A. The Proponent must carry out the project in accordance with the conditions of this approval.

10. In the Notes to condition 10 of Schedule 2, delete the term "4A" and replace with "6".

11. In condition 13 of Schedule 2, after the words "plant and equipment used at the site", insert the words ", or used to monitor the performance of the project,".

12. After condition 17 of Schedule 2, insert the following:

COMPLIANCE

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

13. In condition 23 of Schedule 3:
(a) before the words "described in the EA", insert the word "as";
(b) after the term "EA, ", insert the words "EA (MOD 1) and Landscape and Rehabilitation Management Plan and";
(c) delete the words "and revised"; and
(d) delete Table 7, and its Note, and replace with the following:

Table 7: Summary of the Biodiversity Offset Strategy

Area	***Offset Criteria***	***Size (hectares)***
On-site Offset Area	Existing vegetation to be managed and maintained as: • Scribbly Gum Woodland and/or other native vegetation community commensurate with the local surroundings, including at least 4.44 ha in moderate to good condition; and • suitable habitat for threatened fauna species including the provision of at least 36 nest boxes in the biodiversity offset and landscape buffer areas.	7.0

Note: See Statement of Commitment No 9 for additional biodiversity offset requirements.

14. Delete condition 24 of Schedule 3 and replace with:

24. Within 6 months of the determination of Modification 1, or as otherwise agreed by the Secretary, the Proponent must:
   (a) engage an independent registered surveyor to survey and permanently mark the boundaries of the offset areas;
   (b) submit a survey plan of these boundaries to the Secretary;
   (c) ensure that these boundaries are clearly marked at all times in a permanent manner that allows operating staff, the landowner and inspecting officers to clearly identify those boundaries; and
   (d) cause restrictive and positive covenants under the *Conveyancing Act 1919* to be placed on the titles of the land referring to the surveyed offset areas, to ensure that the Proponent and the landowner:
      - manage the offset areas for conservation in perpetuity;
      - implement the Landscape and Rehabilitation Management Plan; and
      - permit ongoing access to the offset areas by the Department and other relevant public authorities for the purposes of monitoring compliance with the covenants and Landscape and Rehabilitation Management Plan,

   to the satisfaction of the Secretary.

15. In condition 25 of Schedule 3:
(a) after the words "rehabilitation strategy", insert the words "as described"; and

(b) after the term "EA,", insert the words "EA (MOD 1) and Landscape and Rehabilitation Management Plan".

16. In condition 27 of Schedule 3:
(a) before the words "would be integrated" in sub-paragraph (c), insert the words "and Statement of Commitment Number 9";
(b) delete the word "and" at the end of the second bullet point in sub-paragraph (d); and
(c) delete the third bullet point in sub-paragraph (d) and insert the following:

- manage the buffer areas surrounding the extraction area; and
- ensure compliance with the rehabilitation objectives and the progressive rehabilitation obligations in this approval;

17. In the Notes to condition 28 of Schedule 3, delete the term "*Biobanking*" and replace with "*Stewardship*".

18. In condition 29 of Schedule 3, after the words "Independent Environmental Audit (see condition 9 of Schedule 5)", insert the words "or approval of each revised version of the Landscape and Rehabilitation Management Plan".

19. In condition 5 of Schedule 5:
(a) before the words "strategies, plans and programs", insert the words "suitability of all";
(b) delete the number "4" and replace with "6".

20. After condition 5 of Schedule 5, insert the following:

CONSULTATION

5A. Where the conditions of this approval require consultation with an identified party, the Proponent must:
(a) consult with the relevant party prior to submitting the subject document to the Secretary for approval; and
(b) provide details of the consultation undertaken, including:
- the outcome of that consultation, matters resolved and unresolved; and
- details of any disagreement remaining between the party consulted and the Proponent and how the Proponent has addressed any unresolved matters.

However, if the Secretary agrees, a strategy, plan or program may be prepared without consultation being undertaken with an identified party required under a condition of this consent.

21. In condition 6 of Schedule 5:
(a) delete the words "*Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects* (Department of Planning, 2007, or its latest version)" and replace with "*Community Consultative Committee Guidelines: State Significant Projects (2016)*"; and
(b) in the second bullet point of the Notes, delete the word "on", and replace with "of".

22. In condition 9 of Schedule 5:
(a) after the word "be" in sub-paragraph (a), insert the words "led and ";
(b) after the words "relevant agencies" in sub-paragraph (b), insert the words "and the CCC";
(c) delete the word "and" at the end of sub-paragraph (d);
(d) delete the full stop at the end of sub-paragraph (e) and replace with "; and"; and
(e) insert the following sub-paragraph:

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

23. Delete condition 10 of Schedule 5 and replace with the following:

10. Within 3 months of commencing each audit, or within another timeframe agreed by the Secretary, the Proponent must submit a copy of the audit report to the Secretary and any other agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations. The Proponent must implement these recommendations, to the satisfaction of the Secretary.

24. In Appendix 1, in Statement of Commitment Number 9:
(a) delete the number "7.1" after the words "A total of", and replace with "7";
(b) delete the bullet points and replace with:

- Offset Area A. 1.05 hectares of Scribbly Gum Woodland in the east of Lot 1 DP358717;
- Offset Area B. 1.51 hectares of Scribbly Gum Woodland in the west of Lot 1 DP358717; and

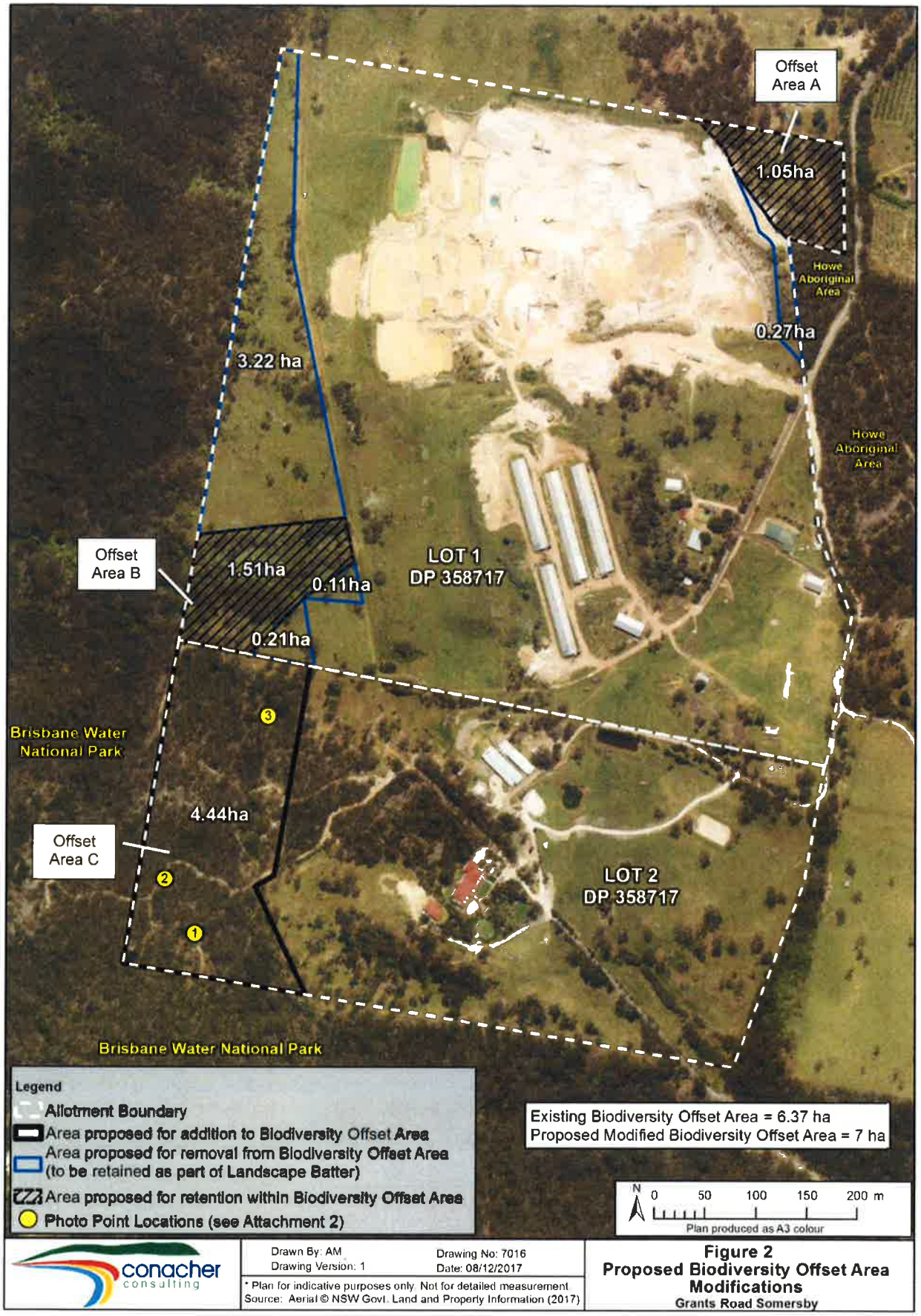
- Offset Area C. 4.44 hectares of Red Bloodwood - Scribbly Gum heathy woodland on sandstone plateaux of the Sydney Basin Bioregion in the west of Lot 2 DP358717.

(c) after the words "exclude livestock", insert "(all areas)";
(d) after the word "feral", delete the words "Rusa Deer, intensive", and insert "deer (Areas A and B),";
(e) after the words "environmental weeds", insert "(Areas A and B)"; and
(f) after the words "36 nest boxes will be erected to compensate for the loss of 18 hollow bearing trees.", insert the words "Any shortfall in hollow-bearing trees will be supplemented by installing either salvaged hollow sections of trees at a ratio of one salvaged hollow section per hollow-bearing tree, or nest boxes at a ratio of two salvaged nest boxes per hollow-bearing tree.".

25. Delete Appendix 3 and replace with the following:

APPENDIX 3

BIODIVERSITY OFFSET AND LANDSCAPE BUFFER AREAS



conacher consulting

Drawn By: AM
Drawing Version: 1
Drawing No: 7016
Date: 08/12/2017

* Plan for indicative purposes only. Not for detailed measurement
Source: Aerial © NSW Govt. Land and Property Information (2017)

Figure 2
Proposed Biodiversity Offset Area Modifications
Grants Road Somersby

conacher consulting

Drawn By: AM
Drawing Version: 1
Drawing No: 8013
Date: 08/12/2017

* Plan for indicative purposes only. Not for detailed measurement.
Source: Aerial © Nearmap (2018) Air Photo Date: 08/08/2017

Landscape Buffer Areas

Grants Road, Somersby

Appendix 3
APPROVAL CONDITIONS + COMPLIANCE

Compliance Checklist

The requirements under the Project Approval and a summary of the compliance with the relevant condition are outlined in the following table for the project. It should be noted that the following table has been updated in accordance with the Modification to the Project Approval dated 4 May 2018.

Unique ID	Compliance Requirement	Monitoring Methodology	Evidence and Comments
Schedule 2 Administrative Conditions			
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, if prevention is not reasonable or feasible, minimise any natural harm to the environment that may result from the construction, operation, or rehabilitation of the project.	Extent of the project	Complies. Refer to Section 4.0 for monitoring results.
2.	The Proponent must carry out the project generally in accordance with the: (a) EA; (b) EA (MODI); and (c) Statement of Commitments	Extent of the project	Complies.
2a.	The proponent must carry out the project in accordance with the conditions of approval.	Extent of the project	Complies.
3.	If there is any inconsistency between the above documents, the more recent document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.	Extent of the project	Noted.
4.	The Proponent must comply with any reasonable 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; (b) any reviews, reports or audits undertaken or commissioned by the Department regarding compliance with this approval; and (c) the implementation of any actions or measures contained in these documents.	Extent of the project	Complies.
5.	If the project has not been physically commenced within 5 years of the date of this approval, then this project approval shall lapse.	25 July 2019	Complies. Project has been physically commenced and therefore condition no longer applies.
6.	The Proponent may carry out quarrying operations on the site until 30 June 2044.	30 Jun 2044	Complies. Consent still operational.
7.	Production must not extract process and transport more than 250,000 tonnes of quarry products.	Per calendar year	Complies. The annual production for the quarry for 2019 was 127 705.47 tonnes.
8.	Surrender of existing development consent for the quarry	By the end of December 2015	Complies. The existing development consent was surrendered by notification to the then Gosford City Council (now Central Coast Council).
9.	Conditions of this approval shall prevail to the extent of any inconsistency with the conditions of that consent	Prior to the surrender of the above development consent.	Condition no longer applicable as the previous consent has been surrendered.

Unique ID	Compliance Requirement	Monitoring Methodology	Evidence and Comments
10.	All new and upgraded structures to comply with the relevant requirements of the BCA	Prior to construction	Complies – no new or upgraded structures undertaken to date.
11.	Demolition work carried out in accordance with the relevant Australian Standard	At demolition	Complies – no demolition works undertaken to date.
12.	Protection of public infrastructure	At all times	Complies – no impact on public infrastructure.
13	All plant and equipment maintained and operated in a proper and efficient manner	At all times	Complies.
14.	Updating and staging of strategies, plans or programs to incorporate any appropriate additional measures to improve the environmental performance of the project.	On a regular basis	Complies – no action required.
15.	Provide quarry production data to DRE and report as part of the Annual Review.	Annually	Complies. Production data provided to DRE. Production data recorded in the Annual Review.
16.	A registered surveyor to mark out the boundaries of the approved limits of extraction within the entire site and submit a survey plan of these boundaries with applicable GPS coordinates to the Secretary.	30 September 2014	Survey undertaken and provided to the Department. Survey marks outlined on the boundary.
17.	Ensure boundaries are clearly marked at all times in a manner that allows operating staff to clearly identify the approved limits of extraction.	Extent of quarrying operations	Survey marks are in place.
18.	Ensure that all of its employees, contractors (and their sub-contractors) are made aware of, and are instructed to comply with, the conditions of this approval relevant to activities they carry out in respect of the project.	Extent of quarrying operations	Complies.
Schedule 3 Environmental Performance Conditions			
Soil and Water			
1.	Ensure sufficient water for the project	Extent of quarrying operations.	Sufficient water is available for the project.
2.	Provide a compensatory water supply to any owner of a privately-owned groundwater bore where monitoring indicates that the project is causing (or contributing to, in conjunction with another quarry project).	When there is a reduction in pumping yield of more than 10% or a 2 m decline in the water table.	Not applicable as there has not been the decline in the water table.
3.	Compliance with s120 of the POEO Act.	Extent of the project	Complies.
4.	Preparation of the Water Management Plan	30 November 2014	Water Management Plan prepared and approved by the Department.
Noise			
5.	Construction activities and quarrying operations on the site to only occur: (a) between 7.00 am and 6.00 pm, Monday to Friday; (b) between 7.00 am and 1.00 pm, Saturday; and (c) at no time on Sunday or public holidays.	Extent of the project	Complies.
6.	The following activities may be carried out on the site outside the hours specified in condition 5: (a) delivery or dispatch of materials as requested by	Extent of the project	Complies.

<table>
<tr><th>Unique ID</th><th>Compliance Requirement</th><th>Monitoring Methodology</th><th>Evidence and Comments</th></tr>
<tr><td></td><td>Police or other authorities; and
(b) emergency work to avoid the loss of lives, property and/or to prevent environmental harm.</td><td></td><td></td></tr>
<tr><td>7.</td><td>The Proponent must ensure that the construction and operational noise generated by the project at any residence on privately owned land does not exceed the following:
<table><tr><th>Receiver Location</th><th>LAeq,15min dB(A)</th></tr><tr><td>All privately owned residences</td><td>40</td></tr></table>
This noise criteria does 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 the agreement.</td><td>Extent of the project</td><td>Complies. The Noise monitoring reports show that operational noise on private residences does not exceed 40 dB(A).</td></tr>
<tr><td>8.</td><td>The Proponent must:
(a) implement best management practice to minimise the construction, operational and road noise of the project;
(b) regularly assess noise monitoring data and relocate, modify and/or stop operations on site to ensure compliance with the noise criteria in this approval;
(c) maintain the effectiveness of noise suppression equipment on plant and equipment on site;
(d) minimise the noise impacts of the project during meteorological conditions under which the noise limits in this approval do not apply;
(e) carry out regular noise monitoring to determine whether the project is complying with the relevant conditions of this approval,
to the satisfaction of the Secretary.</td><td>Extent of the project</td><td>Complies. Refer to Section 4.0.</td></tr>
<tr><td>9.</td><td>Preparation of the Noise Management Plan</td><td>30 November 2014</td><td>Noise Management Plan prepared and approved by the Department.</td></tr>
<tr><td colspan="4">Air Quality</td></tr>
<tr><td>10.</td><td>Ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the project do not exceed the criteria listed below at any residence on privately-owned land</td><td></td><td></td></tr>
<tr><td></td><td>Long-term criteria for particulate matter
<table><tr><th>Pollutant</th><th>Averaging Period</th><th>d Criterion</th></tr><tr><td>Total suspended particulate (TSP) matter</td><td>Annual</td><td>[a] 90 µg/m^3</td></tr><tr><td>Particulate matter < 10 µm (PM_{10})</td><td>Annual</td><td>[a] 30 µg/m^3 Note 1</td></tr></table>Note 1: 30 µg/m^3 criterion has been amended to 25 µg/m^3</td><td>Extent of project</td><td>Complies. The average PM_{10} concentration over the recorded 1-year period was 14.6 µg/m^3, which is well below the annual EPA impact assessment criterion of 25 µg/m^3</td></tr>
</table>

<table>
<tr><th>Unique ID</th><th>Compliance Requirement</th><th>Monitoring Methodology</th><th>Evidence and Comments</th></tr>
<tr><td></td><td>Short-term criteria for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>d Criterion</th></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>24 hours</td><td>a 50 µg/m^3</td></tr>
</table></td><td>Extent of project</td><td>Reported results are well within the EPA maximum 24-hour average criterion of 50 µg/m^3 except for the maximum 24-hour average of 276 µg/m3 recorded on 4 December 2019. This was attributed to the extreme bushfire activity experienced across NSW</td></tr>
<tr><td></td><td>Long-term criteria for deposited dust
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>Maximum increase in deposited dust level</th><th>Maximum total deposited dust level</th></tr>
<tr><td>[c] Deposited Dust</td><td>Annual</td><td>[b] 2 g/m^2/month</td><td>[a] 4 g/m^2/month</td></tr>
</table></td><td>Extent of project</td><td>The average dust deposition level over the recorded period was 0.7 g/m^2/month at R1 and 0.8 g/m^2/month at R4, which are well below the EPA cumulative annual average criterion of 4 µg/m^3. One value at R4 was above the criterion and likely attributed to the bushfires.</td></tr>
<tr><td></td><td>Impact assessment criterion for crystalline silica
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>d Criterion</th></tr>
<tr><td>e Chronic Reference Exposure Level (REL) (PM_4)</td><td>Annual</td><td>3 µg/m^3</td></tr>
</table></td><td>Undertake monitoring at maximum throughput. Monitoring will be repeated quarterly and if two consecutive results demonstrate low risk the monitoring will be discontinued.</td><td>Complies. The inferred annual average respirable crystalline silica concentration is 1.25µg/m^3.</td></tr>
<tr><td>11</td><td>The Proponent must:
(a) implement best practice management to minimise the dust emissions of the project;
(b) regularly assess 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 5);
(d) implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site; and
(e) minimise the area of surface disturbance and maximise progressive rehabilitation of the site; and
(f) carry out regular air quality monitoring to determine whether the project is complying with the relevant conditions of this approval,
to the satisfaction of the Secretary.</td><td>Extent of project</td><td>Complies. Air quality monitoring is carried out regularly and shows compliance with the air quality criteria. Equipment is monitored to minimise the release of greenhouse gas emissions.</td></tr>
<tr><td>12.</td><td>Prepare the Air Quality Management Plan</td><td>30 November 2014</td><td>The Air Quality Management Plan has been prepared and approved by the Department.</td></tr>
</table>

Unique ID	Compliance Requirement	Monitoring Methodology	Evidence and Comments
Meteorological Monitoring			
13.	Ensure that there is a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline.	Extent of the project	Complies. A suitable meteorological station has been placed on site.
Transport			
14.	Keep accurate records of the: • Amount of quarry products transported from the site (per calendar month and year) and • Number of laden vehicle movements from the site (per hour, day, week, calendar month and year).	Publish the records on the website biannually	Complies.
15.	Ensure that: • Project related heavy vehicles enter and exit the site in a forward manner. • All loads will be covered entering or leaving the site. • All laden vehicles leaving the site are cleaned of sand and other material that may fall on the road, before leaving the site.	Extent of the project	Complies.
16.	In conjunction with the operator of the Central Coast Sands Quarry, prepare a road condition assessment and road maintenance contributions study of Grants Road.	31 March 2015	Complies. Grants Road assessment and maintenance report prepared and approved by the Department.
17.	Pay contributions to Council for the maintenance of Grants Road	Payment in accordance with the study required under condition 16, unless otherwise agreed by the Secretary.	Contributions paid to Central Coast Council.
18.	Prepare a Traffic Management Plan including a drivers' code of conduct.	30 November 2014	Traffic Management Plan prepared and approved by the Department.

<table>
<tr><th>Unique ID</th><th>Compliance Requirement</th><th>Monitoring Methodology</th><th>Evidence and Comments</th></tr>
<tr><td colspan="4">Biodiversity</td></tr>
<tr><td>19.</td><td>Ensure that the project does not cause any exceedances of the performance measures in the following table, to the satisfaction of the Secretary

<table><tr><th>Feature</th><th>Measure</th></tr><tr><td>High priority GDEs located within 1 kilometre of extraction operations</td><td>Major environmental consequences including:
• negligible erosion of the surface of the GDEs;
• negligible sedimentation within the GDEs;
• minor changes in the size of the GDEs;
• no significant change to the composition or distribution of species within the GDEs.</td></tr><tr><td>Somersby Mintbush</td><td>Exceedances of Trigger Levels</td></tr></table></td><td>Annually</td><td>All performance targets have been met for GDES.

A decrease in flowering plants of the Somersby Mintbush has occurred in subpopulation.

In the National Park this has occurred possibly due to a number of occurrences. It is suggested that an identification sign be placed on the boundary fence.</td></tr>
<tr><td>20.</td><td>If the performance measures in Condition 19 are exceeded and the Secretary determines that:
(a) it is not reasonable or feasible to remediate the impact or environmental consequence; or
(b) remediation measures implemented by the Proponent have failed to satisfactorily remediate the impact or environmental consequence;

then the Proponent shall provide a suitable offset to compensate for the impact or environmental consequence, to the satisfaction of the Secretary.</td><td>As required</td><td>Sign to be implemented as noted above</td></tr>
<tr><td>21.</td><td>Undertake additional studies on the high priority GDEs located within 1 kilometre of extraction operations under the approval and potentially impacted by the project. The studies must be undertaken in consultation with DoI Water.</td><td>Annually</td><td>Complies. GDE Monitoring and Management Plan approved by the Department.</td></tr>
<tr><td>22.</td><td>The Proponent must prepare and implement, in consultation with OEH and Council, a Somersby Mintbush (Prostanthera junonis) Monitoring Program within the vicinity of the site.</td><td>Annually</td><td>Complies. Somersby Mintbush Monitoring Plan approved by the Department.</td></tr>
</table>

<table>
<tr><th>Unique ID</th><th>Compliance Requirement</th><th>Monitoring Methodology</th><th>Evidence and Comments</th></tr>
<tr><td>23.</td><td>Implement the biodiversity offset strategy described in the EA, EA (EA Mod 1) and Landscape and Rehabilitation Management Plan and as summarised and revised in the following table:

<table><tr><th>Area</th><th>Offset Criteria</th><th>Size (ha)</th></tr><tr><td>On-site offset area</td><td>Existing vegetation to be managed and maintained as:
• Scribbly Gum Woodland and/or other native vegetation community commensurate with the local surroundings, including at least 4.44 ha in moderate to good condition; and
• suitable habitat for threatened fauna species including the provision of at least 36 nest boxes in the biodiversity offset and landscape buffer areas.</td><td>7.0</td></tr></table></td><td></td><td>Complies. The on-site offset area has been set aside. 36 nest boxes have been placed within the area.</td></tr>
<tr><td>24.</td><td>The Proponent must:
(a) engage an independent registered surveyor to survey and permanently mark the boundaries of the offset areas;
(b) submit a survey plan of these boundaries to the Secretary;
(c) ensure that these boundaries are clearly marked at all times in a permanent manner;
(d) cause restrictive and positive covenants under the Conveyancing Act 1919 to be placed on the titles of the land referring to the surveyed offset areas, to ensure that the Proponent and the landowner:
- manage the offset areas for conservation in perpetuity;
- implement the Landscape and Rehabilitation Management Plan; and
- permit ongoing access to the offset areas by the Department and other relevant public authorities for the purposes of monitoring.</td><td>Within 6 months of the determination of Modification 1, or as otherwise agreed by the Secretary,</td><td>The surveyor has prepared and submitted the survey plan to the Department of Planning, Industry and Environment. The surveyor has also completed and submitted the revised Landscape and Rehabilitation Management Plan and Biodiversity offset area and Habitat Rehabilitation Plan to reflect the modified Biodiversity Offset Strategy.

The 88B Instrument has been lodged with the Department</td></tr>
</table>

Unique ID	Compliance Requirement	Monitoring Methodology	Evidence and Comments
Landscape			
25.	Rehabilitate the site to the satisfaction of the Secretary. This rehabilitation must be generally consistent with the rehabilitation strategy in the EA, EA (Mod 1) and Landscape and Rehabilitation Management Plan comply with the following objectives: • Safe, stable and non-polluting. • Minimise the visual impact of the final landforms as far as is reasonable and feasible. • Surface infrastructure to be decommissioned and removed, unless the Secretary agrees otherwise. • Quarry benches suitably landscaped and revegetated using native species. • Establish land with a level of at least Class 4 agricultural suitability over 80% of the quarry floor. • Ensure public safety. • Minimise the adverse socio-economic effects associated with quarry closure.	At the end of the quarry project.	Not applicable at this time of review.
26.	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.	Progressively throughout the quarry operations as required.	Not applicable at this time as all open areas are currently being quarried.
27.	Prepare and implement a Landscape and Rehabilitation Management Plan for the site, including the offset area, to the satisfaction of the Secretary.	31 July 2015 Revised plan November 2019	Landscape and Rehabilitation Management Plan prepared and approved by the Department.
28.	Lodge a Conservation and rehabilitation bond with the Department.	Within six months of approval of the Landscape and rehabilitation management plan	Conservation and rehabilitation bond lodged with the Department.
29.	Review, and if necessary, revise, the sum of the Conservation and Rehabilitation Bond to the satisfaction of the Secretary. This review must: (a) consider the performance of the implementation of the rehabilitation of the site to date; (b) consider the effects of inflation; and (c) calculate the cost of rehabilitating the disturbed areas of the site taking into account the likely surface disturbance over the next 3 years of quarrying operations.	Within 3 months of each Independent Environmental Audit	Not required at this time of the review.
Heritage			
30.	Prepare Heritage Management Plan	30 November 2014	Heritage Management Plan prepared and approved by the Department.

Unique ID	Compliance Requirement	Monitoring Methodology	Evidence and Comments
Visual			
30.	Implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the project to the satisfaction of the Secretary.	Extent of project.	Complies.
31.	Vegetate any earthen perimeter bund at the project, using appropriate flora species to minimise the visual and off-site sedimentation impacts of the project; and maintain this vegetation in a good condition throughout the remainder of the project, to the satisfaction of the Secretary.	Within 3 months of establishing the bund	Complies. Perimeter bunds vegetated.
Waste Management			
32.	(a) minimise and monitor the waste generated by the project; (b) ensure that the waste generated by the project is appropriately stored, handled and disposed of; (c) manage on-site sewage treatment and disposal in accordance with the requirements of Council; and (d) report on waste management and minimisation in the Annual Review, to the satisfaction of the Secretary.	Progressively throughout the quarry operations as required and reported annually.	Complies.
33.	Obtain a 'resource recovery exemption' under the POEO Act and provide evidence to the Department	Prior to import of any VENM to the site.	EPA have advised that a resource recovery exemption is not required. This has been acknowledged and approved by the Department.
Dangerous Goods			
34.	Ensure that the storage, handling, and transport of dangerous goods are done in accordance with the relevant *Australian Standards*, particularly AS1940 and AS1596, and the *Dangerous Goods Code*	Extent of project.	Complies.
Bushfire			
35.	Ensure that the project is suitably equipped to respond to any fires on site and assist the Rural Fire Service and emergency services as much as possible if there is a fire in the vicinity of the site.	Extent of project.	Complies.

Unique ID	Compliance Requirement	Monitoring Methodology	Evidence and Comments
Schedule 4 Additional Procedures			
1.	Notification of monitoring results to landowners where: (a) An exceedance of any relevant criteria in Schedule 3, the Proponent must notify the affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the project is again complying with the relevant criteria, and. (b) an exceedance of any relevant air quality criteria in Schedule 3, the proponent shall 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).	As soon as practicable after obtaining monitoring results	Complies. No exceedances have been determined as part of the monitoring results.
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 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.	Within 2 months of the Secretary's decision.	Not required at this time of the review.
Schedule 5 Environmental Management, Reporting and Auditing			
1.	The Proponent must prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Secretary	30 November 2014	Environmental Management Strategy prepared and approved by the Department.
2.	The Proponent must ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines.	Annually	Complies.

Unique ID	Compliance Requirement	Monitoring Methodology	Evidence and Comments
3.	Assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedule 3. Where any exceedance of these criteria and/or performance measures has occurred, the Proponent must, at the earliest opportunity: (a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not reoccur; (b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and (c) implement remediation measures as directed by the Secretary, to the satisfaction of the Secretary.	Extent of Project.	Assessed as part of the monitoring and annual review. As stated above a sign is proposed to be erected on the boundary fence to identify the subpopulation of the Somersby Mintbush. Air quality exceedance occurred; however, this has been due to the bushfires.
4.	Annual review of the environmental performance of the project to the satisfaction of the Secretary.	By the end of March each year, or other timing as may be agreed by the Secretary.	Complies. Annual Review to be submitted by end of March 2020.
5.	Review the strategies, plans and programs required under this approval, to the satisfaction of the Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted for the approval of the Secretary.	Within 3 months of the submission of an: (a) annual review under condition 4 above; (b) incident report under condition 7 below; (c) audit report under condition 9 below; or (d) any modification to the conditions of this approval,	Strategies will be assessed as part of the Annual Review and amended and resubmitted if required.

Unique ID	Compliance Requirement	Monitoring Methodology	Evidence and Comments
5A	Where the conditions of this approval require consultation with an identified party, the Proponent must: (a) consult with the relevant party prior to submitting the subject document to the Secretary for approval; and (b) provide details of the consultation undertaken. However, if the Secretary agrees, a strategy, plan or program may be prepared without consultation being undertaken with an identified party required under a condition of this consent.	Extent of Project.	Not required to date.
6.	Establish and operate a Community Consultative Committee (CCC) to the satisfaction of the Secretary.	If directed by the Secretary.	The Department of Planning, Industry and Environment required the quarry to operate under the existing Community Consultative Committee. Currently operational.
7.	Notify the Secretary and any other relevant agencies of any incident. Provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.	Immediately Within 7 days of the date of the incident.	It is considered no incidences from the quarry has occurred.
8.	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.	Extent of project.	Complies. All reporting provided on the website once approved.
9.	Commission and pay the full cost of an Independent Environmental Audit of the project.	By 30 June 2015 and every 3 years thereafter, unless the Secretary directs otherwise.	Initial Independent Environmental audit undertaken in 2015. Environmental audit undertaken in 2018.
10.	Submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.	Within 3 months of completion of the audit, or as otherwise agreed by the Secretary.p	Next Environmental audit due September 2021.

Unique ID	Compliance Requirement	Monitoring Methodology	Evidence and Comments
11.	Make copies of the following publicly available on its website: • the documents referred to in condition 2 of Schedule 2; • all 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, and the Proponent's response to the recommendations in any audit; • minutes of CCC meetings; • any other matter required by the Secretary; and keep this information up to date, to the satisfaction of the Secretary.	Extent of project	Complies. The Grants Road Sand Quarry website incorporates: • Modification to The Project Approval • The Project Approval • Environmental Assessment • The Environmental Strategy • Plans of Management • Complaints Register • Truck movements • Independent Audit • Annual Reviews • Minutes of the CCC meetings

Appendix 4
WATER QUALITY MONITORING
Larry Cook Consulting Pty Ltd

Larry Cook Consulting Pty Ltd

WATER MONITORING
PERIOD 1.1.19 – 31.12.19

GRANTS ROAD SAND QUARRY

Grants Road Sand
Lot 1 in DP358717
270 Grants Road Somersby

PREPARED FOR: **GRANTS ROAD SAND**

PROJECT NUMBER: **20021**

DATE: **20TH FEBRUARY 2020**

Larry Cook Consulting
(ABN 27 159 132 055)

PO Box 8146 TUMBI UMBI NSW 2261
Office: 02 4340 0193 Mobile: 0428 884645 Email: larrycookconsulting@gmail.com

COPYRIGHT

Author and Document Control

Written/Submitted by:	**Reviewed / Approved by:**
Larry Cook *Senior Hydrogeologist & Environmental Consultant* *Larry Cook Consulting Pty Ltd*	

Record of Distribution

Copies	**Report No. & File Name**	**Status**	**Date**	**Prepared for:**
1 x PDF	20021-A	Rev.1 Ed.1	20th February 2020	Grants Road Sand

TABLE OF CONTENTS

LIST OF TABLES, FIGURES & APPENDICES

TABLES

FIGURES

ANNEXURES

1.0 INTRODUCTION

1.1 PURPOSE AND OBJECTIVES

Grants Road Sand was granted state government approval to produce a range of sand products and high-quality hard rock in their quarrying operations at Lot 1 in DP358717, 270 Grants Road Somersby (the Site). A modified project approval was granted by the Minister of Planning under Section 75J of the Planning and Assessment Act 1979 in 2018 to incorporate Lot 2 in DP 358717 and a modification (MOD 1) regarding a Biodiversity Offset Area.

Larry Cook Consulting Pty Ltd was commissioned by *Grants Road Sand* to prepare an annual Water Monitoring Report documenting the results of ongoing water monitoring in a network of dedicated monitoring bores and surface water monitoring sites strategically located within the *Grants Road Sand* quarry precinct. Monitoring included collection and compilation of automated water level measurements and prescribed water quality testing.

The objectives of the water monitoring are documented in the Groundwater Management Plan prepared by *Larry Cook Consulting Pty Ltd* for *Grants Road Sand* in 2014 (Ref. 11017-D dated November 2014) and in the Surface Water Management Plan prepared by *Larry Cook Consulting Pty Ltd* for *Grants Road Sand* in 2015 (Ref. 11017-E dated February 2015). The objectives of the management plans were prepared in accordance with Schedule 3 Part 4 (c) (i, ii, iii & iv) of the Project Approval.

2.0 SITE DETAILS

2.1 LOCATION AND SITE IDENTIFICATION

The existing sand quarry and proposed quarry extension are located on Grants Road in Lots 1 and 2 in DP358717 on the Somersby Plateau.

The location of the Property is shown in **Figure 1**. The topographic map sheet covering the Property is the 1:25,000-scale Gosford topographic map sheet (9131-2S.) The approximate MGA coordinates of the centre of the proposed Project Site are Easting 338500 m and Northing 6304250 m. The key features required to identify the Site are summarised in **Table 1**.

Table 1
Site Identification Details

Site	**Description**
Site Name	Grants Road Sand
Site Owner	G.R. & A.K. Jones
Address	270 Grants Road Somersby NSW 2250

Title Plan	Lots 1 and 2 in DP358717
LGA	Central Coast Council

3.0 WATER MONITORING SITES

A network of groundwater monitoring bores and surface water monitoring sites are established on the Site.

Water level monitoring is undertaken in four dedicated monitoring bores. Water quality sampling and testing is carried out in two of these monitoring bores and at three surface water monitoring sites. The locations of the surface water and groundwater monitoring (sample) sites are shown in **Figure 2** and locations of the monitoring bores (sampling and water level) annotated in **Figure 3.** A register of the monitoring sites provided in **Table 2**.

Table 2
Register of Water Monitoring Sites

Monitoring Site	Monitoring Type	Location	Monitoring
W1	Surface Water	North-west discharge point	Water quality
W4	Surface Water	Culvert on south-west waterway	Water quality
S1	Surface Water	South-west waterway on western boundary of Lot 1	Water quality
G4 (BH 4)	Groundwater	Bore on NW corner of decant Pond	Water quality and automated water level
G3 (BH 3)	Groundwater	Bore in NW corner of Lot 1 (control bore)	Water quality and automated water level
DDH 1	Groundwater	Northern central part of Lot 1	Automated water level
DDH 2	Groundwater	Southern central part of Lot 1	Automated water level

4.0 GROUNDWATER LICENSING

Four active groundwater licenses are held by the owners. A register listing the licenses and annual water entitlements is provided in **Table 3**.

Table 3 Water Take					
License	**WSP and Water Source**	**Water Entitlement**	**Passive Take/Inflows**	**Active Pumping**	**Total**
WAL 36455	Water Sharing Plan North Coast and Porous Rock Kulnura Mangrove Mountain Groundwater Source	14 ML	Passive Take	Nil	82 ML
WAL 36988		50 ML			
WAL 37745		6 ML			
WAL 37746		12 ML			

It is noted that the sand processing operation utilises rainfall stored in dams/ponds. Groundwater is not used for the sand extraction activities or processing operations. A total of 82 ML licensed water entitlement is held which is used to offset pit inflow (passive take) predicted in the computer groundwater model.

5.0 AUTOMATED WATER LEVEL MEASUREMENTS

Automated water level measurements were collected in water level sensors installed in the network of four monitoring bores.

A composite set of hydrographs is presented in **Figure 3**. The following observations and comments are provided:

- The composite hydrographs reveal a general rise in the water table between June and mid-September 2016 followed by a commensurate decline to about February 2017.

  A rise in the water levels between February 2017 and mid April 2017 is in response to significant rainfall events between about late February and late March. The recharge response to rainfall is most noted in Monitoring Bore BH3.

  With the exception of a small rise (spike) in water levels recorded in mid June 2017 in response to a rain event at the same time, water levels in all four monitoring bores has shown a gradual decline to levels recorded in mid-February 2017.

  The water levels in all four monitoring bores are observed to rise between March and April 2018 then plateau with a hint of water level decline through to about October 2018. Communication problems with sensors in BH 3 and DDH 2 are presently being assessed and reinstated.

  A gentle increase in water level is noted in DDH1 between October and November 2018 with sharp spikes observed during the same period in BH 4. The water levels are noted to gently fall through to the end of 2018.

- A gradual steady decline in the waster table is noted in monitoring bores DDH 1 and DDHs to November 2019 interrupted by sharp rainfall recharge events recorded in mid-March and September. The rate of decline is observed to accelerate significantly between November and the end of 2019 with a recorded 2.5 m decrease in the water level. The water level sensors installed in monitoring sites G3 (BH3) and G4 (BH4) had data transmission issues.
- The character of the hydrographs for monitoring bores DDH 1 and DDH 2 is consistent with predictions that the relative deeper sub-horizontal sandstone aquifers that can be effectively separated and semi-confined (and sometimes confined) by interbedded relatively massive sandstone units that possess lower hydraulic conductivities. Although this relatively deeper set of aquifers in DDH 1 and DDH 2 show a direct response to rainfall events, they do not usually respond as rapidly or in magnitude (amount of water level fluctuations) to the shallower aquifer intersected in the relatively shallow monitoring bores BH 3 and BH 4.
- No potential impacts from current approved quarrying activities on this aquifer system were detected.

6.0 WATER SAMPLING

Prescribed water sampling was undertaken in the nominated groundwater monitoring bores and surface water monitoring sites by *Grants Road Sand* during the reporting period 1.1.19 through 31.12.19. Just one campaign of sampling and testing was successfully undertaken: in August 2019. The two surface water monitoring sites were dry during the other proposed sampling periods in March, June and December.

The samples were submitted to the project's NATA accredited laboratory ALS Environmental for a suite of prescribed tests and determinations listed in **Table 4** in order to reveal any trends in the results and any potential contamination from quarrying and sand washing activities. The samples were transported to the project laboratory under Chain of Custody (COC) protocol.

Table 4 List of Analytes and Tests
pH
Total Suspended Solids (TSS)
Total Dissolved Solids
Nitrite + Nitrate as N
Total Kjeldahl Nitrogen as N
Total Nitrogen as N
Total Phosphorus as P

7.0 QUALITY ASSURANCE & QUALITY CONTROL

7.1 DATA QUALITY OBJECTIVES

The data quality objectives of the investigation were to obtain sufficient representative data to allow a high quality groundwater assessment including:

- Characterisation of groundwater quality; and
- Identification of any risks posed to the environment.

The assessment was conducted to a standard consistent with generally accepted and current professional consulting practice for such an investigation. The evaluation criteria (Decision Rules) adopted for the investigation are summarised in **Table 5**.

Table 5
Data Quality Objectives

DQO	Evaluation Criteria
Documentation completeness	Completion of calibration records, chain of custody documentation, laboratory test certificates from NATA-accredited laboratory
Data comparability	Use of appropriate techniques for the sampling, storage and transportation of samples. Use of NATA accredited laboratory.
Data representativeness	Adequate sampling coverage dictated by distribution of pre-selected monitoring bores, and selection of representative samples
Precision and accuracy for sampling and analysis	Use properly trained and qualified field personnel. Achieve laboratory QC criteria.

7.2 FIELD QA/QC

The Quality Assurance and Quality Control QA/QC protocols used during the fieldwork are listed in **Table 6**.

Table 6 Field QA/QC	
Protocol	**Description**
Sampling Team	The fieldwork was managed and carried out by an experienced technician or suitably trained staff member.
QA/QC System	All fieldwork was conducted in accordance with Industry Standard Sampling Procedure.
Chain of Custody Forms	All samples were logged and transferred under appropriately completed Chain of Custody (COC) Forms.
Preservation	All samples were delivered to the project laboratory in appropriately preserved containers, with preservation consisting of packing samples in eskies with ice.
Blind Field Duplicates	Duplicate testing was not carried out for these assessments.

7.3 LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

The project laboratory (ALS) used for the tests and chemical analysis of samples during 2019 is NATA accredited for the selected tests and analysis.

8.0 RESULTS

Laboratory results are summarised in **Table 7**. Copies of the laboratory certificates supplied by Grants Road Sand are provided in **Annexure 1**.

In summary:

- Monitoring Site S1 on the south-western boundary of the Site (drainage) was noted to be dry during attempts to collect a sample in the first half of 2019 and in December 2019. However, water sampling was successfully undertaken in August 2019.
- Monitoring sites W1 and W4 were also noted to be dry during attempts to collect a sample in the first half of 2019 and in December 2019. However, water sampling was successfully undertaken in August 2019.
- The **pH** of the surface water (W1, W4 and S1) in the August 2019 sampling campaign ranged from slightly acidic in W4 and S1 to slightly alkaline in W1. The pH of groundwater (G3 and G4) tested in August and December 2019 is moderately acidic that reflects rainwater recharge (carbonic acid) and retention of water within Hawkesbury Sandstone. The pH values are typical of groundwater hosted by the Hawkesbury Sandstone on Mangrove Mountain.
- The concentrations of **Total Suspended Solids (TSS)** recorded in the two groundwater monitoring bores (G3 and G4) were all less than the LOR. The exception is G4 that recorded a low concentration of 5 mg/L. The concentration of TSS recorded in the three surface water samples were at low concentrations (7 mg/L in W4) or less than the LOR (W1 and S1).

Table 7 Composite Analytical Results

SAMPLE		Guidelines		Limit of Reporting	G3						G4					
DESCRIPTION					Monitoring Bore (Groundwater)						Monitoring Bore (Groundwater)					
DATE																
ANALYTE	UNIT	Drinking Water - Health Guidelines [1]	Trigger Value for the Protection of Freshwater Aquatic Ecosystems [2] (95% level protection)		14/3/18	18/6/18	25/9/18	1/12/18	12/8/19	17/12/19	14/3/18	18/6/18	25/9/18	1/12/18	12/8/19	17/12/19
pH	pH Units	ISD		0.01	5.83	4.46	4.35		5.25	5.1	5.91	4.68	4.4		5.24	5.2
Total Suspended Solids	mg/L			5.0	<5	<5	<5		<5	<5	<5	<5	<5		<5	5
Total Dissolved Solids	mg/L			10.0	113	109	99		100		124	106	101		100	
Nitrate + Nitrite as N	mg/L			0.0	4.37	4.63	4.64		4.58		4.99	4.24	4.66		4.66	
Total Nitrogen as N	mg/L			0.1	4.8	5.2	5.1		5.1		5.7	4.9	5.2		5.3	
Total Kjeldahl Nitrogen	mg/L			0.1	0.4	0.6	0.5		0.5		0.7	0.7	0.5		0.6	
Total Phosphorus as P	mg/L			0.01	<0.01	<0.01	<0.01		<0.01		<0.01	0.01	0.01		<0.01	

SAMPLE		Guidelines		Limit of Reporting	W1						W4						S1					
DESCRIPTION					Surface Water Monitoring Site						Surface Water Monitoring Site						Surface Water Monitoring Site					
DATE																						
ANALYTE	UNIT	Drinking Water - Health Guidelines [1]	Trigger Value for the Protection of Freshwater Aquatic Ecosystems [2] (95% level protection)		14/3/18	18/6/18	25/9/18	1/12/18	12/8/19	17/12/19	14/3/18	18/6/18	25/9/18	1/12/18	12/8/19	17/12/19	14/3/18	18/6/18	29/6/17	1/12/18	12/8/19	17/12/19
pH	pH Units	ISD		0.01	6.67	6.72	DRY	DRY	7.17	DRY	6.67	6.74	DRY	DRY	6.91	DRY	6.05	6.51	DRY	DRY	6.41	DRY
Total Suspended Solids	mg/L			5.0	15	<5			<5		12	<5			7		<5	<5			<5	
Total Dissolved Solids	mg/L			10.0	97	178			71		105	174			72		253	159			72	
Nitrate + Nitrite as N	mg/L			0.0	0.04	0.05			0.08		0.05	0.05			0.09		0.04	0.05			0.09	
Total Nitrogen as N	mg/L			0.1	1.6	1.0			0.9		1.6	1.0			0.8		1.0	1.00			0.60	
Total Kjeldahl Nitrogen	mg/L			0.1	1.6	1.0			0.8		1.5	1.0			0.7		1.0	1.00			0.50	
Total Phosphorus as P	mg/L			0.01	0.12	0.08			0.02		0.1	0.08			0.04		0.07	0.08			0.01	

[1] **Drinking Water Guidelines**: National Water Quality Management Strategy 2011 Version 3.1 updated March 2015

[2] **Australian and New Zealand Guidelines for Fresh and Marine Water Quality**. National Water Quality Management Strategy (ANZECC 2000)

Note: ISD denotes insufficient data to set a guideline value based on health considerations

- The concentration of **Total Dissolved Solids (TDS)**. in the two groundwater samples is 100 mg/L which indicate low salinity. Levels of TDS between 71 and 72 mg/L were recorded in the three surface water samples. These levels also indicate low salinity.
- The concentrations of **Nitrate plus Nitrite** range from 4.58 and 4.66 mg/L in the two groundwater samples to less than 0.09 mg/L in the three surface water samples. Relative soluble nitrate is likely associated with the agricultural history of the area.
- The concentrations of **Total Kjeldahl Nitrogen** range from 0.50 and 0.60 mg/L in groundwater samples to between 0.5 and 0.8 mg/L in surface water samples.
- Levels of **Total Phosphorus** were recorded at less than the LOR in the two groundwater samples and between 0.01 and 0.04 mg/L mg/L in surface water samples. Phosphorus is likely associated with the agricultural history of the area.
- No potential impacts from current approved quarrying activities on this aquifer system were detected.

9.0 DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

Based on the results of surface water and groundwater testing obtained during the period 1.1.19 through 31.12.19, the following discussion, conclusions and recommendations are provided.

GEOCHEMISTRY

- The pH of the surface water sampled is slightly acidic to slightly alkaline that reflects rainwater recharge over the quarry precinct and potential mixing with local groundwater hosted by the Hawkesbury Sandstone. The recorded pH measurements are within the range of acceptable and agreed discharge levels.
- The concentrations of Total Suspended Solids (TSS) recorded in groundwater samples were at low concentrations or less than the LOR with low to non-detect levels recorded in the surface water samples. Therefore, the recorded TSSs are less than the discharge level limit.
- Low levels of nutrients likely reflect the agricultural history of the district (fertilisers and chicken growing),
- No impacts from current approved quarrying activities on this aquifer system were detected.

WATER LEVEL MONITORING

- The close correlation between rain events and the rise in water levels recorded in shallow monitoring bores suggests relative rapid recharge of the shallow aquifer system, especially in Monitoring Bore BH 3 and to a lesser extent in BH 4. This is consistent with the results of extensive groundwater investigations over the Site and surrounding district.
- The hydrographs for the relatively deeper monitoring bores also show a direct response to rainfall events but with a more subdued magnitude.

- No potential impacts from approved quarrying activities on this aquifer system were detected.

RECOMMENDATIONS

- Continue acquisition and charting of water level measurements in the network of four groundwater monitoring bores.
- Make repairs to the groundwater monitoring sites and reinstate the installed water level data loggers.
- Carry out regular routine surface water and groundwater monitoring in the monitoring network during 2020 in accordance with the requirements documented in the surface water and groundwater management plans. This includes maintenance and make repairs to pressure sensors to maintain integrity and communications.
- Reinstate oil & grease testing at surface water sample site S1 at the frequency of one sample per month when discharge occurs.
- Submit water samples to the project laboratory (ALS) for analysis, compile results and assess any trends and exceedances and, if required, implement a response and action plan in accordance with the environmental management plans.
- Prepare a report giving the results of the 2020 monitoring program and an assessment of any trends and potential impacts. This will include an ongoing assessment of hydrographs, pH, TSS, nitrogenous compounds and other tests as required.

10.0 ENVIRONMENTAL PERFORMANCE

A summary of the environmental performance assessed against the approved criteria documented in the Groundwater Management Plan and Surface Water Management Plan is provided in **Table 8**.

Table 8 Environmental Performance					
Environmental Aspect	**Approval Criteria**	**Summary Monitoring Results Period 1/1/17-31/12/17**	**Summary Monitoring Results Period 1/1/18-31/12/18**	**Summary Monitoring Results Period 1/1/19-31/12/19**	**Proposed Improvement Measures**
Groundwater	Section 4 - Schedule 3 of Project Approval and Appendix 1 - Statement of Commitments. • Undertake automated water level measurements in four nominated monitoring bores G3 (BH3), G4 (BH4), DDH1 & DDH2. Minimum 4 hourly readings. • Undertake groundwater sampling in	• Hydrographs for the four monitoring bores reveals fluctuations in water level associated with climate changes. Shallow monitoring bores show sharp rises due to rainfall recharge events. • No impacts from quarrying	• Hydrographs for the four monitoring bores reveals fluctuations in water level associated with climate changes. Shallow monitoring bores show sharp rises due to rainfall recharge events. • No impacts from quarrying	• Hydrographs for the two operational monitoring bores reveals fluctuations in water level associated with climate changes. • No impacts from quarrying activities on the aquifer system were detected	• Restore integrity of loggers in monitoring bores G3 and G4 and carry out maintenance as required, including batteries. • Search new technology to improve phone communications on the Site for loggers. Significant interference in this area from nearby translator towers. Presently researching a satellite solution.

	representative monitoring bores G3 & G4. Three monthly sampling • Undertake automated rainfall measurements – tipping bucket rain gauge.	activities on the aquifer system were detected • Automated daily rainfall collected	activities on the aquifer system were detected • Automated daily rainfall collected	• Automated daily rainfall collected	• Ensure the integrity of the installed sampling equipment and full suite of analytes is tested.
Surface Water	Section 4 - Schedule 3 of Project Approval and Appendix 1 - Statement of Commitments. • Undertake surface water sampling at representative sampling sites W1, W4 - three monthly sampling and testing when ponds discharging, and monthly testing for site S1 when discharging.	• Results of pH, TDS, TSS, N compounds, TKN, TP • No exceedances or impacts from quarrying activities on the aquifer system were detected	• Results of pH, TDS, TSS, N compounds, TKN, TP • No exceedances or impacts from quarrying activities on the aquifer system were detected	• Results of pH, TDS, TSS, N compounds, TKN, TP • No exceedances or impacts from quarrying activities on the aquifer system were detected	• Reinstate oil & grease testing at site S1

11.0 COMPLIANCE STATUS

A summary of the compliance requirements, monitoring methodology and evidence for the development is provided in **Table 9**.

Table 9
Compliance Status

Section	Compliance Requirement	Development Phase	Monitoring Methodology	Evidence
Section 7 in Appendix 1 - Statement of Commitments - Groundwater	• Water level measurements	• At all times	• Automated real time measurements in water level sensors, data loggers with telemetry	• Real time minimum 4-hourly measurements downloaded as required. Data stored/archived in a dedicated data base and hydrographs constructed
	• Water sampling and testing	• At all times	• Regular prescribed sampling (3 monthly for G3 and G4).	• COCs and laboratory certificates
	• Rainfall monitoring	• At all times	• Automated real time measurements of rainfall with telemetry	• Real time 4-hourly measurements downloaded as required. Data stored/archived in a dedicated data base
	• Compile results of the monitoring program including a review and assessment of trends, exceedances and impacts	• Annually	• Reporting	• Annual report

Section 8 in Appendix 1 - Statement of Commitments – Surface Water	• Water sampling and testing	• At all times	• Regular prescribed sampling (3 monthly for W1 and W4 and 1 monthly for S1)	• COCs and laboratory certificates
	• Compile results of the monitoring program including a review and assessment of trends, exceedances and impacts	• Annually	• Reporting	• Annual report

12.0 CLOSURE

Please do not hesitate to contact Larry Cook on 0428 884645 if you have any questions or you require further information.

For and on behalf of
Larry Cook Consulting

Larry Cook
Hydrogeologist and Environmental Consultant

ANNEXURES

Annexure 1

Laboratory Certificates

Sampling August 2019

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1925532**	Page	: 1 of 2
Client	: **GR & AK Jones**	Laboratory	: Environmental Division Sydney
Contact	: Ms Leanne Jones	Contact	: Customer Services ES
Address	: 270 Grants Rd Somersby NSW 2350	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: Water Samples	Date Samples Received	: 13-Aug-2019 11:45
Order number	:	Date Analysis Commenced	: 13-Aug-2019
C-O-C number	: ----	Issue Date	: 20-Aug-2019 20:33
Sampler	: Steven Jones		
Site	: ----		
Quote number	: Blanket Quote		
No. of samples received	: 5		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Client sample ID	W1	W4	G3	G4	S1
			Client sampling date / time	12-Aug-2019 09:30	12-Aug-2019 09:30	12-Aug-2019 09:30	12-Aug-2019 09:30	12-Aug-2019 09:30
Compound	*CAS Number*	*LOR*	*Unit*	**ES1925532-001**	**ES1925532-002**	**ES1925532-003**	**ES1925532-004**	**ES1925532-005**
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.17**	**6.91**	**5.25**	**5.24**	**6.41**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**71**	**72**	**100**	**100**	**72**
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	**7**	<5	<5	<5
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.08**	**0.09**	**4.58**	**4.66**	**0.09**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.8**	**0.7**	**0.5**	**0.6**	**0.5**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**0.9**	**0.8**	**5.1**	**5.3**	**0.6**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.02**	**0.04**	<0.01	<0.01	**0.01**

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1925532**	Page	: 1 of 4
Client	: **GR & AK Jones**	Laboratory	: Environmental Division Sydney
Contact	: Ms Leanne Jones	Contact	: Customer Services ES
Address	: 270 Grants Rd Somersby NSW 2350	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: Water Samples	Date Samples Received	: 13-Aug-2019
Order number	:	Date Analysis Commenced	: 13-Aug-2019
C-O-C number	: ----	Issue Date	: 20-Aug-2019
Sampler	: Steven Jones		
Site	: ----		
Quote number	: Blanket Quote		
No. of samples received	: 5		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA005P: pH by PC Titrator (QC Lot: 2522184)									
ES1924888-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.53	7.53	0.00	0% - 20%
ES1925519-002	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	6.38	6.28	1.58	0% - 20%
EA005P: pH by PC Titrator (QC Lot: 2522189)									
ES1925561-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.00	6.96	0.573	0% - 20%
ES1925551-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	8.05	7.92	1.63	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 2524916)									
ES1924879-004	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	644	648	0.464	0% - 20%
ES1925532-004	G4	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	100	100	0.00	No Limit
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 2524915)									
ES1924879-004	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.00	No Limit
ES1925532-004	G4	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 2524777)									
ES1925580-005	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.33	0.33	0.00	0% - 20%
ES1925580-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.11	0.11	0.00	0% - 50%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 2524773)									
ES1925532-001	W1	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	0.6	22.1	No Limit
ES1925580-006	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 2524774)									
ES1925532-001	W1	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.02	0.05	87.6	No Limit
ES1925580-006	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.01	0.02	59.7	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 2522184)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	99.8	98	102
				----	7 pH Unit	100	98	102
EA005P: pH by PC Titrator (QCLot: 2522189)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	99.8	98	102
				----	7 pH Unit	100	98	102
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 2524916)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	102	87	109
				<10	293 mg/L	94.7	66	126
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 2524915)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	105	83	129
				<5	1000 mg/L	92.4	82	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 2524777)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	107	91	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 2524773)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	89.4	69	101
				<0.1	1 mg/L	80.9	70	118
				<0.1	5 mg/L	92.2	74	118
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 2524774)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	87.9	71	101
				<0.01	0.442 mg/L	78.4	72	108
				<0.01	1 mg/L	91.5	78	118

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 2524777)							
ES1925580-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	106	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 2524773)							
ES1925532-002	W4	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	91.3	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 2524774)							
ES1925532-002	W4	EK067G: Total Phosphorus as P	----	1 mg/L	85.4	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1925532**	Page	: 1 of 5
Client	: **GR & AK Jones**	Laboratory	: Environmental Division Sydney
Contact	: Ms Leanne Jones	Telephone	: +61-2-8784 8555
Project	: Water Samples	Date Samples Received	: 13-Aug-2019
Site	: ----	Issue Date	: 20-Aug-2019
Sampler	: Steven Jones	No. of samples received	: 5
Order number	:	No. of samples analysed	: 5

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural						
W1, W4, G3, G4, S1	----	----	----	13-Aug-2019	12-Aug-2019	**1**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser						
Clear Plastic Bottle - Natural						
G3, G4	----	----	----	15-Aug-2019	14-Aug-2019	**1**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser						
Clear Plastic Bottle - Natural						
G3, G4	15-Aug-2019	13-Aug-2019	**2**	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser						
Clear Plastic Bottle - Natural						
G3, G4	15-Aug-2019	14-Aug-2019	**1**	----	----	----

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P)							
W1, W4, G3, G4, S1	**12-Aug-2019**	**----**	----	----	**13-Aug-2019**	12-Aug-2019	×
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H)							
W1, W4, G3, G4, S1	**12-Aug-2019**	**----**	----	----	**15-Aug-2019**	19-Aug-2019	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H)							
W1, W4, G3, G4, S1	**12-Aug-2019**	**----**	----	----	**15-Aug-2019**	19-Aug-2019	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Natural (EK059G)							
G3, G4	**12-Aug-2019**	**----**	----	----	**15-Aug-2019**	14-Aug-2019	×
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
W1, W4, S1	**12-Aug-2019**	**----**	----	----	**15-Aug-2019**	09-Sep-2019	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Natural (EK061G)							
G3, G4	**12-Aug-2019**	**15-Aug-2019**	13-Aug-2019	×	**15-Aug-2019**	12-Sep-2019	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
W1, W4, S1	**12-Aug-2019**	**15-Aug-2019**	09-Sep-2019	✓	**15-Aug-2019**	09-Sep-2019	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Natural (EK067G)							
G3, G4	**12-Aug-2019**	**15-Aug-2019**	14-Aug-2019	×	**15-Aug-2019**	12-Sep-2019	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
W1, W4, S1	**12-Aug-2019**	**15-Aug-2019**	09-Sep-2019	✓	**15-Aug-2019**	09-Sep-2019	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	4	35	**11.43**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	4	35	**11.43**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	13	**23.08**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	3	20	**15.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 1/29 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 6/585 Maitland Road Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: GR & AK Jones	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☐ Standard TAT **(List due date):**	**FOR LABORATORY USE ONLY (Circle)**
OFFICE: 270 Grants Rd, Somersby NSW 2250		☐ Non Standard or urgent TAT **(List due date):**	Custody Seal Intact? Yes / No / N/A
PROJECT: Water Samples **PROJECT NO.:**	**ALS QUOTE NO.:**		Free ice / frozen ice bricks present upon receipt? Yes / No / N/A
ORDER NUMBER: **PURCHASE ORDER NO.:**	**COUNTRY OF ORIGIN:**	**COC SEQUENCE NUMBER (Circle)** COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Leanne Jones **CONTACT PH:** 0417 443 960			Other comment:
SAMPLER: Steven Jones **SAMPLER MOBILE:** 0418 116 861	**RELINQUISHED BY:**	**RECEIVED BY:**	**RELINQUISHED BY:** / **RECEIVED BY:**
COC Emailed to ALS? (YES / NO) **EDD FORMAT (or default):**	*Leanne Jones*	TAS	
Email Reports to (will default to PM if no other addresses are listed): info@grantsrdsand.com.au	DATE/TIME: *12/8/2019 10.30am*	DATE/TIME: 13/8/19 11:45	DATE/TIME: / DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed): info@grantsrdsand.com.au			
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:			

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).									Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES										Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	W1	12/8/19 9.30am			2	TN	TP	TSS	PH	TDS					
2	W4	12/8/19 9.30am			2	TN	TP	TSS	PH	TDS					
3	G3	12/8/19 9.30am			1	TN	TP	TSS	PH	TDS					
4	G4	12/8/19 9.30am			1	TN	TP	TSS	PH	TDS					
5	S1	12/8/19 9.30am			2	TN	TP	TSS	PH	TDS					
				TOTAL											

HT

Environmental Division Sydney
Work Order Reference
ES1925532

Telephone : + 61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

Sampling December 2019

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1942042**	Page	: 1 of 2
Client	: **GR & AK Jones**	Laboratory	: Environmental Division Sydney
Contact	: Ms Leanne Jones	Contact	: Customer Services ES
Address	: 270 Grants Rd Somersby NSW 2350	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: Water Samples	Date Samples Received	: 18-Dec-2019 13:40
Order number	: ----	Date Analysis Commenced	: 20-Dec-2019
C-O-C number	: ----	Issue Date	: 24-Dec-2019 11:29
Sampler	: Steven Jones		
Site	: ----		
Quote number	: Blanket Quote		
No. of samples received	: 2		
No. of samples analysed	: 2		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Client sample ID	**G3**	**G4**	**----**	**----**	**----**
			Client sampling date / time	17-Dec-2019 14:30	17-Dec-2019 14:30	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES1942042-001**	**ES1942042-002**	**--------**	**--------**	**--------**
				Result	Result	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	**5**	**----**	**----**	**----**

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1942042**	Page	: 1 of 3
Client	: **GR & AK Jones**	Laboratory	: Environmental Division Sydney
Contact	: Ms Leanne Jones	Contact	: Customer Services ES
Address	: 270 Grants Rd Somersby NSW 2350	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: Water Samples	Date Samples Received	: 18-Dec-2019
Order number	: ----	Date Analysis Commenced	: 20-Dec-2019
C-O-C number	: ----	Issue Date	: 24-Dec-2019
Sampler	: Steven Jones		
Site	: ----		
Quote number	: Blanket Quote		
No. of samples received	: 2		
No. of samples analysed	: 2		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 2779637)									
ES1942026-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	9	10	13.0	No Limit
ES1942082-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	8	7	23.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 2779637)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	110	83.0	129
				<5	1000 mg/L	96.2	82.0	110

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1942042**	Page	: 1 of 4
Client	: **GR & AK Jones**	Laboratory	: Environmental Division Sydney
Contact	: Ms Leanne Jones	Telephone	: +61-2-8784 8555
Project	: Water Samples	Date Samples Received	: 18-Dec-2019
Site	: ----	Issue Date	: 24-Dec-2019
Sampler	: Steven Jones	No. of samples received	: 2
Order number	: ----	No. of samples analysed	: 2

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H)							
G3, G4	**17-Dec-2019**	**----**	----	----	**20-Dec-2019**	24-Dec-2019	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Suspended Solids (High Level)	EA025H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Suspended Solids (High Level)	EA025H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Suspended Solids (High Level)	EA025H	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)

27/12/19

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

☐BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5800 E: gladstone@alsglobal.com

☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

☐MUDGEE 1/29 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

☐NEWCASTLE 5/585 Maitland Road Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com

☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: GR & AK Jones	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT **(List due date):**	**FOR LABORATORY USE ONLY (Circle)**
OFFICE: 270 Grants Rd, Somersby NSW 2250		☐ Non Standard or urgent TAT **(List due date):**	Custody Seal Intact? Yes / No / N/A
PROJECT: Water Samples **PROJECT NO.:**	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)**	Free ice / frozen ice bricks present upon receipt? Yes / No / N/A
ORDER NUMBER: **PURCHASE ORDER NO.:**	**COUNTRY OF ORIGIN:**	COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Leanne Jones **CONTACT PH:** 0417 443 960		OF: 1 2 3 4 5 6 7	Other comment:
SAMPLER: Steven Jones **SAMPLER MOBILE:** 0418 116 861	**RELINQUISHED BY:** Leanne Jones	**RECEIVED BY:** Frazi	**RELINQUISHED BY:**
COC Emailed to ALS? (YES / NO) **EDD FORMAT (or default):**	DATE/TIME: 17/12/19 4.30pm	DATE/TIME: 18/12/19 1.40p	DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed): info@grantsrdsand.com.au			**RECEIVED BY:**
Email Invoice to (will default to PM if no other addresses are listed): info@grantsrdsand.com.au			DATE/TIME:

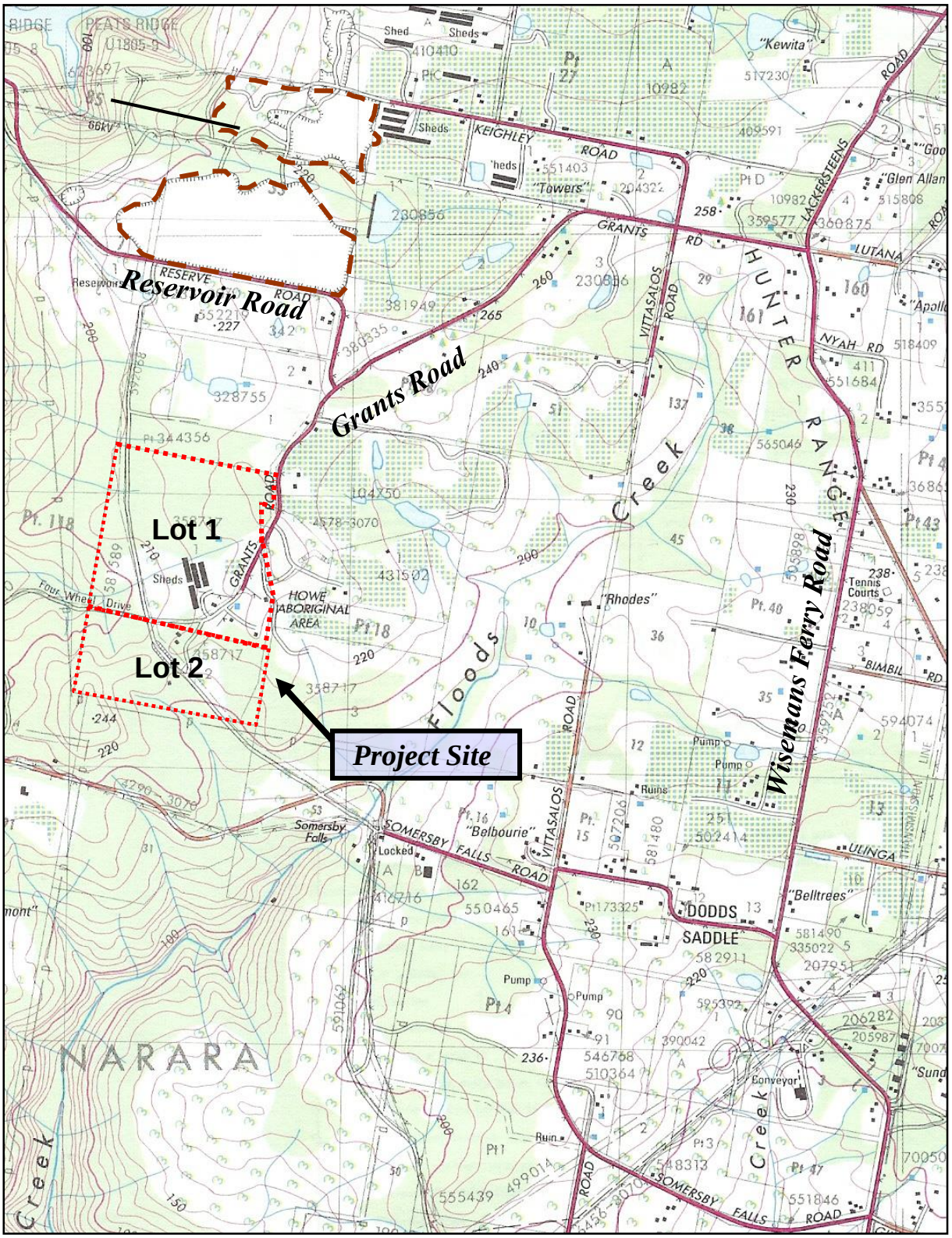
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES									Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	G3	17/12/19 2.30pm			1	TSS								
2	G4	17/12/19 2.30pm			1	TSS								
				TOTAL										

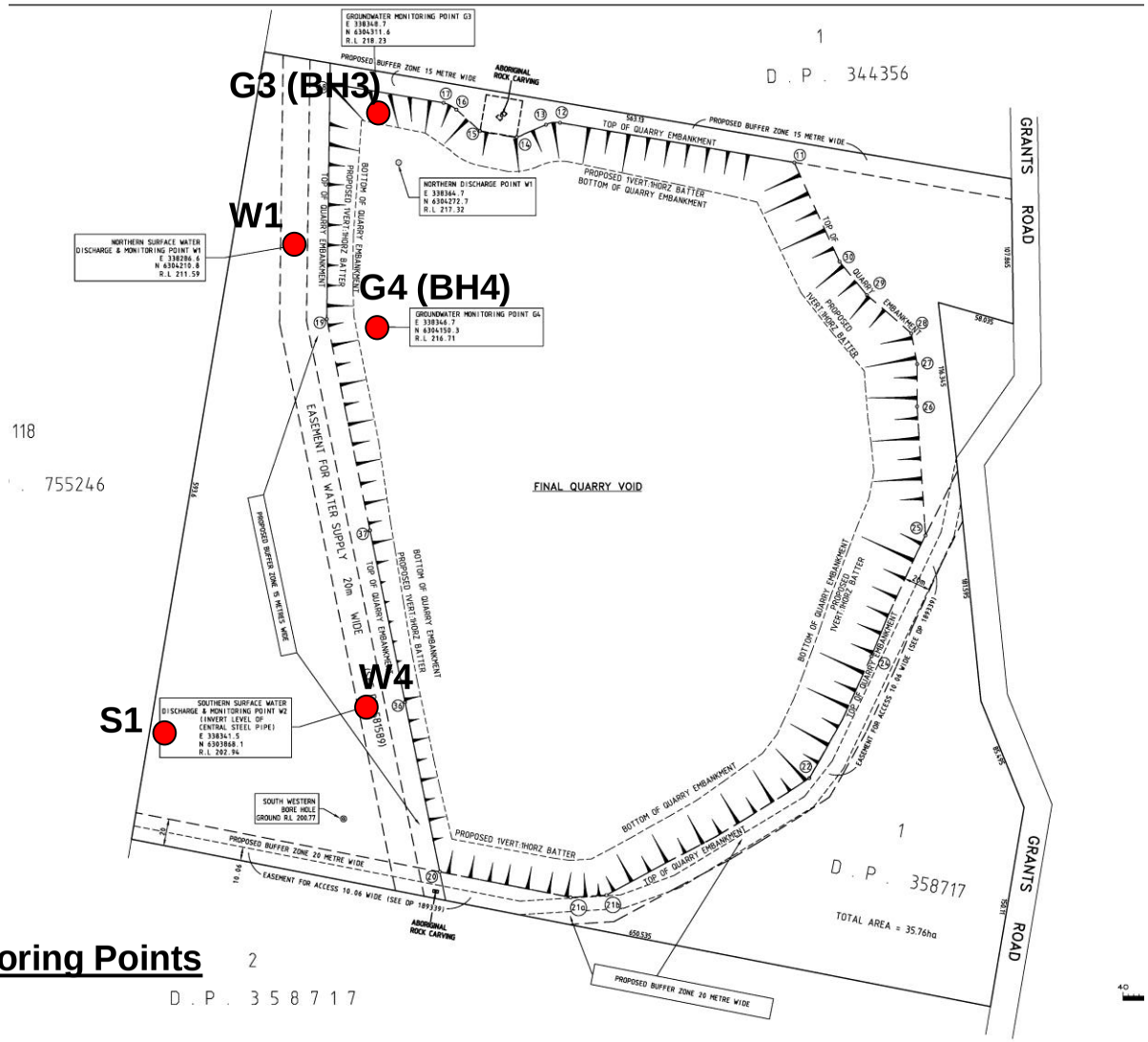
Environmental Division
Sydney
Work Order Reference
ES1942042

Telephone : +61-2-8784 8555

FIGURES



Larry Cook Consulting **PO Box 8146** **Tumbi Umbi NSW 2261** **Ph: 02 4340 0193**	**Grants Road Sand Quarry**	Scale: As shown
	Location of Project Site	**FIGURE 1**



Surface Water Monitoring Points
W1, W4 & S1

Groundwater Monitoring Points
G3 & G4

Modified after Stephen Thorne & Associates (2015)

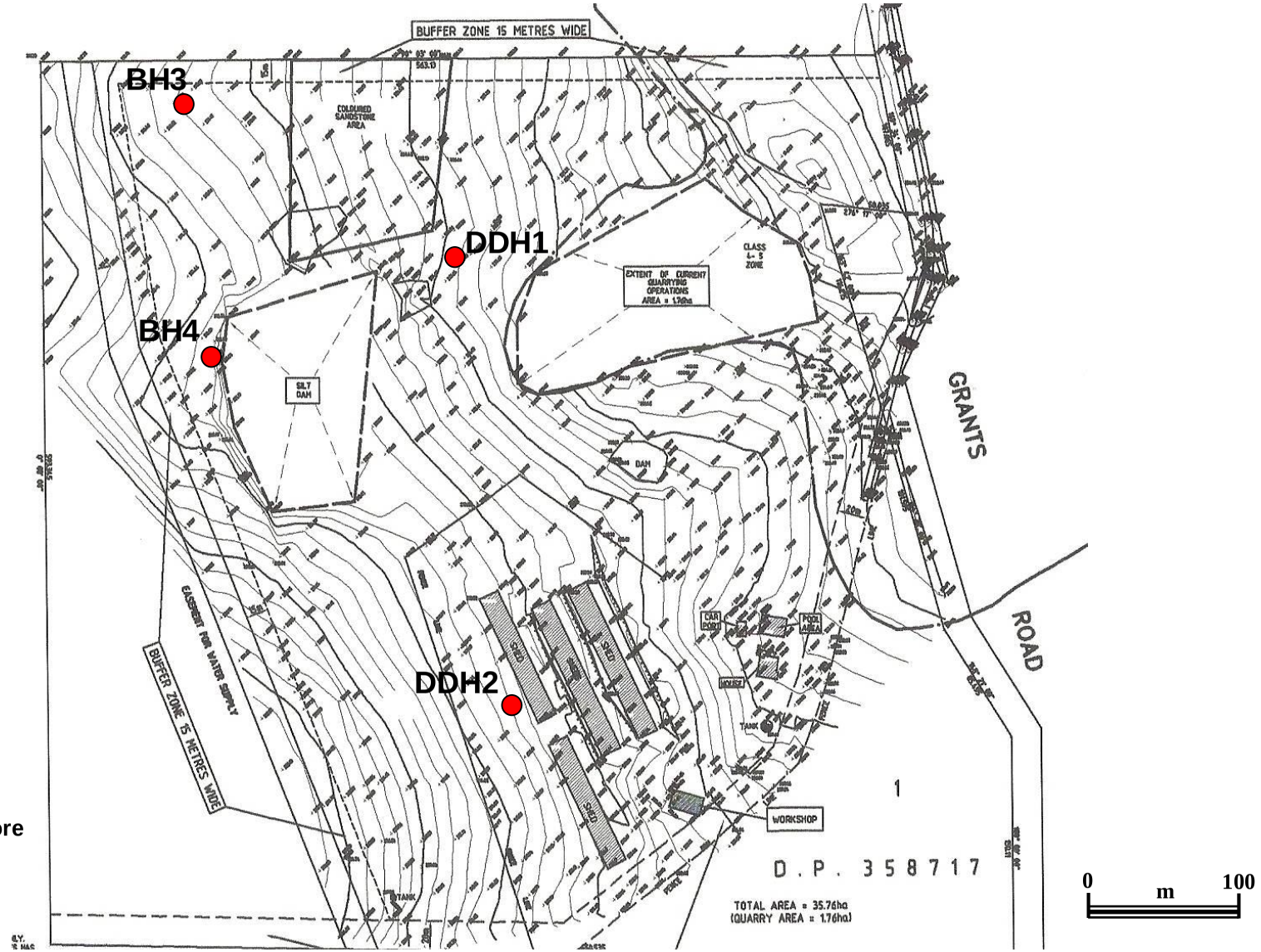
Larry Cook Consulting
PO Box 8146
Tumbi Umbi NSW 2261
Ph 02 4340 0193

Grants Road Sand Quarry

Locations of Monitoring Sites

Scale: As shown

FIGURE 2



Larry Cook Consulting
PO Box 8146
Tumbi Umbi NSW 2261
Ph 02 4340 0193

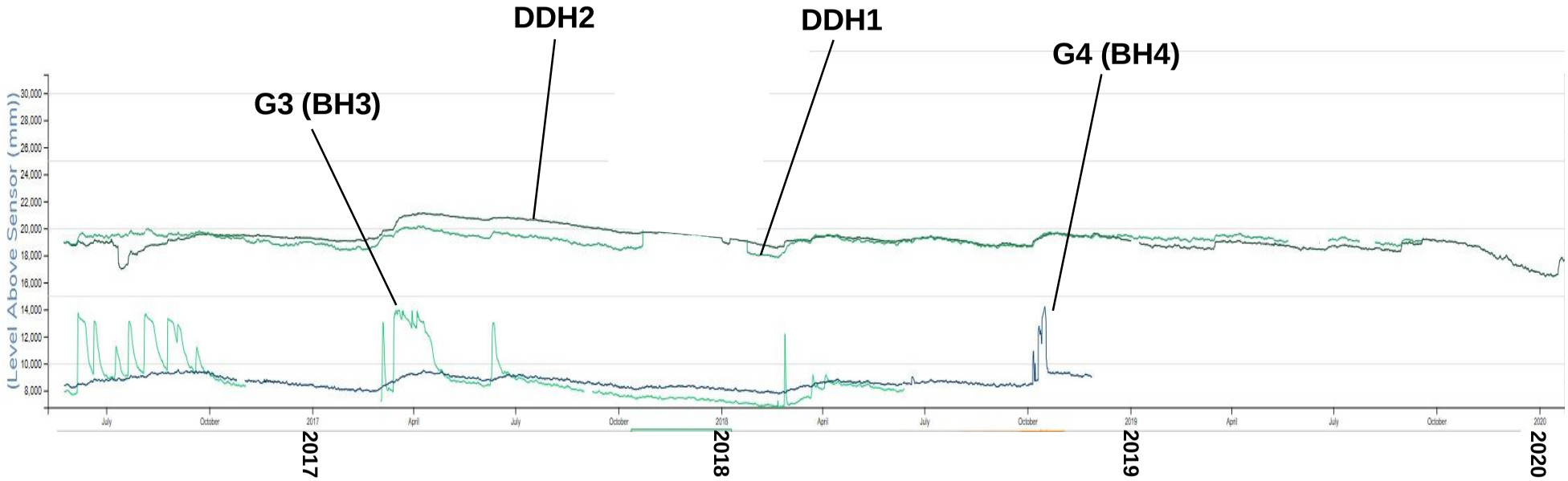
Grants Road Sand Quarry

Site Plan and Locations of Monitoring Bores

N

Scale: As shown

FIGURE 3



Larry Cook Consulting
PO Box 8146
Tumbi Umbi NSW 2261
Ph 02 4340 0193

Grants Road Sand Quarry

Composite Hydrographs

N

Scale: As shown

FIGURE 4