Grants Rd Sand

Grants Road Sand Quarry
Annual Review

1 January 2015 to 31 December 2015

PROJECT APPROVAL 08_0099

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APPENDICES

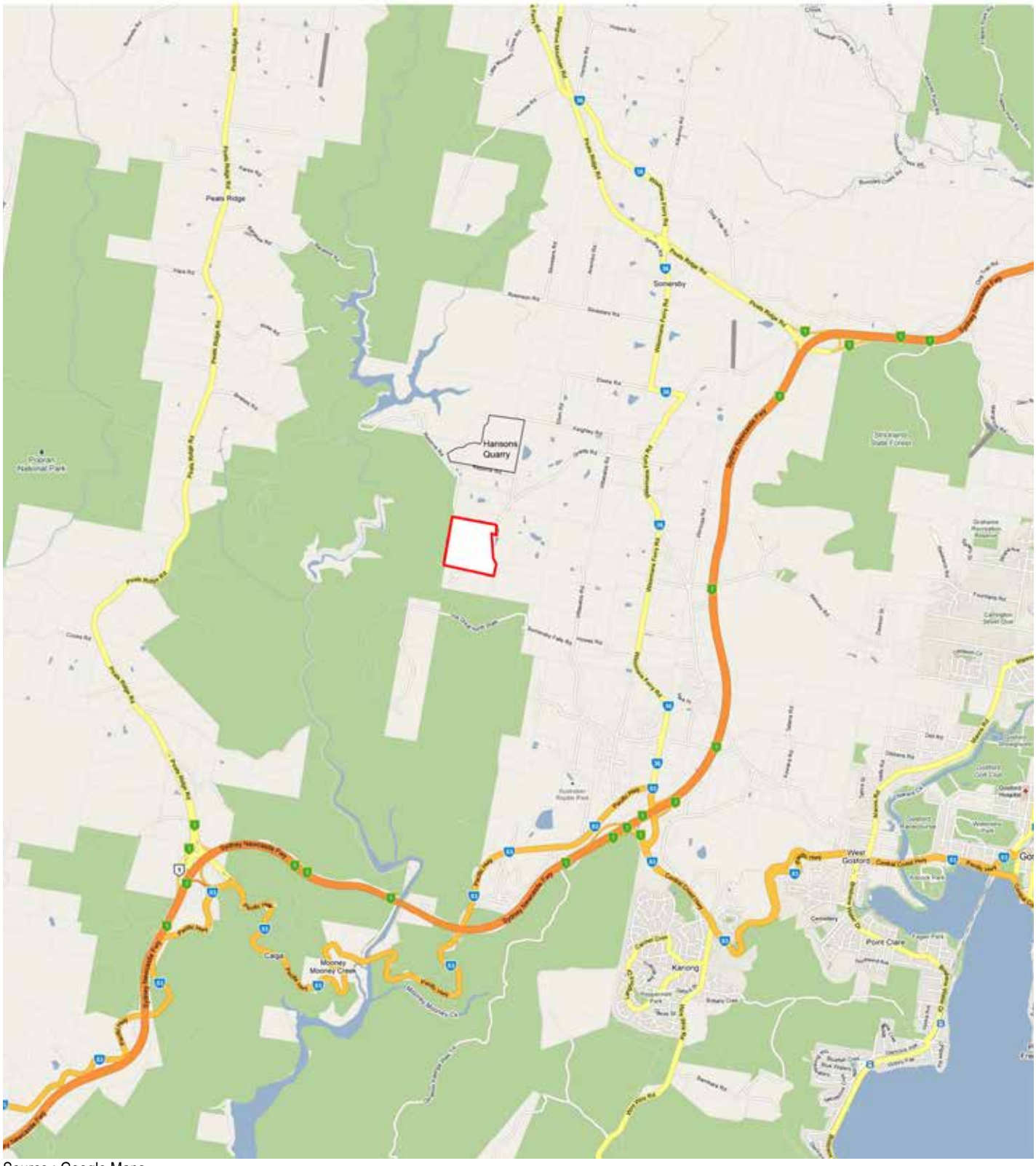
1. Introduction

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. The Annual Review is for the period from 1 January 2015 to 31 December 2015 (the reporting period). Figure 1 shows the location and extent of the quarry. The Project Approval is included in Appendix 1.

It should be noted that quarrying under the Project Approval 08_0099 had not commenced as at 31 December 2015. The focus for the Grants Road Sand Quarry has been the preparation and implementation of the various requirements under the Project Approval. Further, activities continued to operate under Development Consent DA 22952/1998 from Gosford City Council within the existing approved areas until this consent was surrendered by Grants Road Sand Quarry at the end of December 2015 in accordance with Schedule 2 Condition 8 of the Project Approval. This Annual Report therefore provides a review of the activities that have occurred during the reporting period and also documents the activities and environmental monitoring planned to be undertaken at the Quarry in 2016.

Schedule 5 condition 4 of the Project Approval 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 Earth

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.

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	WAL3569	23 July 2013	
Water Licence	WAL36455	1 November 2013	
Water Licence	WAL 17440	24 April 2014	
Water Licence	WAL 36988	13 January 2015	

2.4. Environmental Performance Conditions

The environmental performance requirements under the Project Approval include:

Table 2 – Environmental Criteria

Control Measure	Timing / Frequency
Soil and Erosion Measures	
1. Erosion control and water management structures will remain in place until slopes and exposed areas are fully stabilised and revegetated. Dams will be retained as pollution control devices.	As required

<table>
<tr><th>Control Measure</th><th>Timing / Frequency</th></tr>
<tr><td colspan="2">Groundwater Impact Monitoring</td></tr>
<tr><td>1. Water level monitoring
Automatic water level measurements in water level data loggers installed in monitoring bores.</td><td>• Initial 4-hourly (1 sample every 4 hours)
• Assess data after 12 months
• Depending on results and trends, decrease frequency to 8-hourly (1 sample every 8 hours)
• Downloaded initially at 1 month intervals</td></tr>
<tr><td>2. Water Quality Monitoring
Groundwater sampling in representative monitoring bores.</td><td>• Initial 3-monthly (1 sample per bore every 3 months) for 12 months
• Assess data after 12 months
• Depending on results and trends decrease frequency to 6-monthly (1 sample every 6 months)</td></tr>
<tr><td>3. Rainfall Monitoring
Automatic rainfall measurements in tipping bucket rain gauge data logger on site.</td><td>Continuous logging at every 0.2 mm tip with time/date stamps</td></tr>
<tr><td>4. Ground Water Reporting
• A complete set of water level data and groundwater quality monitoring results will be recorded, collated and reported including a statistical analysis and a comparison of water level monitoring results.</td><td>Six-monthly basis for the first 12 months then on an annual basis</td></tr>
<tr><td colspan="2">Surface Water Impact Monitoring</td></tr>
<tr><td>1. Surface Water Monitoring
Undertake surface water sampling at the following monitoring sites:
• W1 – Process water dam;
• W4 – Culvert on south-west waterway.
• S1 – South-west waterway on western boundary of Lot 1.</td><td>• Monthly (1 sample per monitoring site every month) for 12 months
• Assess data after 12 months
Depending on results and trends decrease frequency to quarterly (1 sample every 3 months)
• Within 12 hours prior to any controlled discharge; and
• Weekly during any discharge</td></tr>
<tr><td>2. Rainfall Monitoring
Automatic rainfall measurements in tipping bucket rain gauge data logger on site.</td><td>Continuous logging at every 0.2 mm tip with time/date stamps</td></tr>
<tr><td>3. Surface Water Reporting
• Surface water quality monitoring results will be recorded, collated and duly reported in-house
• review of results and any exceedances.</td><td>Six-monthly for the first 12 months then on an annual basis</td></tr>
<tr><td colspan="2">Noise Impact Monitoring</td></tr>
<tr><td>1. Noise Monitoring

The Proponent shall ensure that the construction and operational noise generated by the project 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>
Monitoring procedures will include:
• Attended noise measurements over fifteen (15) minutes at each receiver noting aural observations, recording LA90 and LAeq noise levels and weather conditions (specifically wind speed and direction);</td><td>Annually</td></tr>
</table>

<table>
<tr><th>Control Measure</th><th>Timing / Frequency</th></tr>
<tr><td>

- Determination of LAeq,15min noise contribution from Grants Road Sand Quarry activities for each receiver location;
- Review of Grants Road Sand Quarry contributions compared to noise criteria;
- Attended nearfield or midfield measurements of individual site plant and equipment to confirm operating noise levels and sound power levels;
- Conduct second round of attended noise measurements at the reference monitoring locations over fifteen (15) minutes at each receiver noting aural observations, recording LA90 and LAeq noise levels and weather conditions (specifically wind speed and direction);
- Determination of LAeq,15min noise contribution from Grants Road Quarry activities at receivers.

</td><td></td></tr>
<tr><td>2. Noise level testing of all plant or machinery to ensure acoustic performance compliance.</td><td>Annually</td></tr>
<tr><td colspan="2">Air Quality Impact Monitoring</td></tr>
<tr><td>1. Meteorological Monitoring
Parameters to be measured include:
<table>
<tr><th>Parameter</th><th>Units</th><th>Averaging Period</th><th>Sampling Method</th></tr>
<tr><td>Rainfall</td><td>mm</td><td>1-hour</td><td>AM-4</td></tr>
<tr><td>Temperature @ 2 m</td><td>ºC</td><td>15 minute</td><td>AM-4</td></tr>
<tr><td>Temperature @ 10 m</td><td>ºC</td><td></td><td>AM-2 and AM-4</td></tr>
<tr><td>Wind Speed @10 m</td><td>m/s</td><td></td><td>AM-2 and AM-4</td></tr>
<tr><td>Wind Direction @ 10 m</td><td>Degrees</td><td></td><td>AM-2 and AM-4</td></tr>
<tr><td>Sigma Theta</td><td>Degrees</td><td></td><td>AM-2 and AM-4</td></tr>
<tr><td>Solar Radiation</td><td>W/m2</td><td></td><td>AM-4</td></tr>
</table>
</td><td>Continuous</td></tr>
<tr><td>2. Air Quality Monitoring
Monitoring PM_{10} at the most affected off-site location. High Volume Air Sampler (HVAS) for long term compliance monitoring at the most affected receptor.
Air Quality Standards / Goals for Particulate Matter
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>Standard / Goal</th><th>Agency</th></tr>
<tr><td rowspan="2">Particulate matter with an equivalent aerodynamic diameter less than 10 μm (PM_{10})</td><td>24-hour maximum</td><td>50 $\mu g/m^3$</td><td>EPA impact assessment criteria;
NEPM reporting goal (allows five exceedances per year for bushfires)</td></tr>
<tr><td>Annual mean</td><td>30 $\mu g/m^3$</td><td>EPA impact assessment criteria</td></tr>
</table>
Notes: $\mu g/m^3$ – micrograms per cubic metre, μm – micrometre.</td><td>As noted and reviewed on an as needs basis and for the annual review</td></tr>
<tr><td>3. Greenhouse Gas Monitoring
Primarily monitoring the use of:

- Diesel
- Oil
- Grease
- Electricity.

Monitoring will be undertaken in accordance with the requirements of the National Greenhouse and Energy Reporting Act 2007 and the National Greenhouse and Energy Reporting Regulations 2008.</td><td>Annually</td></tr>
</table>

Control Measure	Timing / Frequency
Transport Impact Controls	
1. Minimising impact on surrounding road network • Project related heavy vehicles trucks will enter and exit the site in a forward manner. • All loads will be covered prior to leaving the site. • All laden vehicles leaving the site are cleaned of and other material that may fall on the road, before leaving the site.	At all times
2. Monitoring of product transport The quarry will keep accurate records of the following and publish the records on its website: • 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).	Biannually
3. Traffic Management • Ensure all visitors, customers and contractors are inducted in regards to the traffic management requirements. • All hazards and incidents to be reported immediately and appropriate action implemented.	At all times
GDE Monitoring	
1. GDE monitoring surveys	Annually
Monitoring of Somersby Mintbush	
1. Somersby Mintbush monitoring surveys Areas of Somersby Mintbush are to be sampled by undertaking counts of the baseline populations identified. The outer extent of each population is to be mapped with the aid of a hand-held GPS device.	Annually
2. Somersby Mintbush Management Plan Undertake an internal review of the Management Plan.	As required
Biodiversity Impact Monitoring	
1. Biodiversity Offsets monitoring Monitoring of biodiversity offsets is to be undertaken initially prior to and then following vegetation clearing operations under the approval. Monitoring is required to assess the establishment and maintenance of at least 4 hectares of moderate – good quality Scribbly Gum Woodland vegetation and report on any nest box maintenance or replacement necessary over 10 years during stage 2 works. Biodiversity offset areas are to be monitored annually with fixed 400m^2 monitoring quadrats. The following is to be assessed for each quadrat: • Floristics; • Native plant cover; • Exotic plant cover; • Plant regeneration (including percentage survival for plantings); • Condition of deer exclusion fencing; • Signs of surface erosion and sedimentation; • Presence of feral animals; • Natural Disturbance; • Fixed photo point observations; and • Nest box condition.	Annually
Landscape and Rehabilitation Monitoring	
1. Monitoring the effectiveness of the measures and progress against the performance and completion criteria.	To be determined
2. Update of the Landscape and rehabilitation management Plan.	Every three years

Control Measure	Timing / Frequency
3. Conservation and rehabilitation bond Lodgement of a conservation and rehabilitation bond with the Department.	Within six months of approval of the Landscape and rehabilitation management plan
Heritage Impact Monitoring	
1. Inspection An inspection will be carried out one year post approval (25th July, 2015) or post fencing and at the time of inspection of the biodiversity area, which ever arises first.	As outlined
2. Biodiversity Offset Area The Biodiversity Offset Area will be inspected by an archaeologist and the RAPs prior to any revegetation or other works.	Prior to any works within the Biodiversity offset area
3. Howes Aboriginal Monitoring Program The site 45-3-3343 will be incorporated into the Howes Reserve Aboriginal Monitoring program.	Five yearly
4. Consultation with the RAPs The quarry will issue a newsletter or other relevant correspondence to the RAPS informing of the progress of the quarry site and of any relevant monitoring results.	Six monthly
Visual Impact Monitoring	
Monitoring of the management measures to minimise the visual impact would be undertaken as part of the annual review.	Annually
Waste Management Impact Monitoring	
Monitoring of the management measures to minimise waste would be undertaken as part of the annual review.	Annually
Bushfire Impact Monitoring	
Monitoring of the management measures to manage bushfire would be undertaken as part of the annual review.	Annually

2.5. Other Performance Conditions

Other performance requirements outlined in the Project Approval include:

- The annual quarry production date is to be provided to the Department of and included in the Annual Review.
- An Independent Environmental Audit is to be carried out by 30 June 2015 and every three years thereafter.

3. Activities undertaken during the Reporting Period

3.1. Site Inspection

A site visit and meeting with the Quarry Manager, Steven Jones and Directors of Grants Road Sand Quarry Leanne Jones and Graham Jones was carried out on 11 March 2016. The purpose of the site visit was to undertake a visual assessment of the site and discuss the activities undertaken within the reporting period.

3.2. Activities

The following outlines the key activities undertaken at Grants Road Sand Quarry during the reporting period. As previously noted, there was no quarrying undertaken during the Reporting Period as approved under the Project Approval. Quarrying activities were carried out under the existing development consent.

Table 3 – Key Activities

Month	Activities
January	• Newsletter sent to the Aboriginal Land Councils.
February	• Lodgement of the draft Environmental Management Plan including all Management Plans.
March	
April	
May	
June	• Newsletter sent to the Aboriginal Land Councils. • Establishment of the earth and sound mounds in the south of the quarry. Vegetation of earth and sound mounds. • Purchase, placement and calibration of the weather station on site.
July	• Preparation and lodgement for approval by the Department of the draft Landscape and Rehabilitation Management Plan. • Compliance audit carried out by the Department. • Erection of fence around the Aboriginal site and inspection of same by the Heritage Consultant. • Preparation, lodgement and approval by the Department of the Grants Road maintenance contributions study. Placement of the study on the project website. • Purchase, installation and commissioning of the weather station and Hi Volumiser.
August	• Independent environmental audit undertaken and lodged with the Department.
September	• Purchase of wash plant.
October	• Placement of the 36 nest boxes within the Biodiversity area.
November	• Finalisation of the Landscape and Rehabilitation Management Plan taking into consideration the Department's comments. Placement of the study on the project website. • Preparation and lodgement of the Annual Review for 2014.
December	

Source: Grants Road Sand Quarry 2016

3.3. Quarrying and Extraction

As previously noted, quarrying under project approval had not commenced during the reporting period. Quarrying was undertaken in the appropriate area in accordance with the DA consent 22952/1998 from Gosford City Council. It was reported that 30,557 tonnes were extracted during the period from July 2014 to June 2015.

The site is also still used for chicken farming and cattle grazing.

Figure 3 - Quarry Operations 11 March 2016

Figure 4 – Noise and Sound Mound

Figure 5 – Wash and Screen Plant

Figure 6 – Weather Station

4. Environmental Monitoring

Grants Road Sand Quarry engaged the various consultants in January 2016 to undertake the environmental monitoring of the quarry site in accordance with Project Approval 08_0099.

4.1. Water Quality

Monitoring of surface water and ground water has been undertaken of the quarry site prior to the commencement of the Project Approval in accordance with the draft Plan of Management for Water Quality. The Water Quality Monitoring Report has been prepared by Larry Cook Consulting Pty Ltd and is attached in Appendix 2.

Water level monitoring is undertaken in five 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 2015 to 31 December 2015.

Table 4 – Register of Water Monitoring Sites

Monitoring Site	Monitoring Type	Location	Monitoring
W1	Surface Water	Process water dam	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
G1 (BH1)	Groundwater	Bore in NE corner of Lot 1	Water quality and automated water level
G4 (BH4)	Groundwater	Bore on NW corner of decant Pond	Water quality and automated water level
BH 3	Groundwater	Bore in NW corner of Lot 1 (control bore)	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

A summary of the results are:

- Monitoring Site S1 on the south-western boundary of the Site (set of three discharge pipes) is noted to be dry at different times.
- The pH of the surface water (W1 W4 and S1) is slightly acidic to near neutral that reflects rainwater recharge and temporary retention of water within Hawkesbury Sandstone.
- The levels of oils and grease tested in surface water samples (W1, W4 and S1) were less than the Limit Of Reporting (LOR) for the various NATA accredited laboratories used in 2015. Measurement of Total Oils and Grease does not specify the hydrocarbon species. The Guidelines for Assessing Service Station Sites. EPA, 1994 was used to compare the results. Because the information needed to establish threshold values is incomplete, a threshold criterion of 10 mg/L was used, as suggested by NSW EPA.
- The concentration of Total Suspended Solids (TSS) recorded in the two groundwater monitoring bores (G1 and G4) and in the surface water monitoring sites W4 and S1 were less than the LOR. The exception is surface water monitoring site W1 which returned levels either less than the LOR or at low concentrations (7 mg/L in August 2015 and 6 mg/L in October 2015).
- No potential impacts from current approved quarrying activities on this aquifer system were detected.

4.2. Noise

A site attended noise audit was undertaken of the existing quarrying operations being undertaken in Area A, which is in accordance with the existing development consent. The Noise audit was undertaken by Atkins Acoustics and Associates Pty Ltd and is attached in Appendix 3.

Site inspections during the audit identified that onsite extraction and processing was established in Area A. Activities included:

- Wet Sand Wash Plant in western portion of Area A.
- Commander Screen and Loader 1 on upper processing area within western portion of Area A.
- Truck 1 route between upper processing area and site entry.
- Stone saw in central portion of Area A.

Site inspection and attended noise audits were conducted between 8.30am and 1.45pm on Monday 18 January 2016. Weather conditions during the audit were clear and dry with calm to light breeze from the south (1-2m/sec).

The site attended sound pressure level measurements were conducted at three (3) locations selected to represent the residential receivers identified in Grants Road Sand draft Noise Management Plan dated September 2015.

The reference measurement locations are:

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

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

dBA re: 20 x 10^{-6} Pa

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					
40.4	40.6	29.8	53.9	<30	Local domestic, birds, distant traffic, insects. GRS inaudible,
41.2	41.3	29.6	51.3	<30	Local domestic, birds, distant traffic, insects. GRS inaudible.
Location 2: McGregor Residence – 239 Grants Road					
42.1	44.6	34.7	53.0	<35	Local domestic, Motorway traffic, insects, Hanson trucks; GRS inaudible,
44.8	47.5	39.0	53.7	<35	Local domestic, distant traffic, insects. Hanson trucks; GRS occasionally audible (saw cutting).
Location 3: Sammut Residence – 210 Grants Road					
51.5	56.0	38.6	62.5	<35	Local domestic, birds, insects, Hanson trucks. GRS inaudible. (noise controlled by birds),
38.5	41.5	35.2	45.8	<35	Local domestic, distant traffic, insects. Hanson trucks; GRS inaudible.
Location 4: National Park					
39.3	40.9	37.2	44.0	<40	Birds, Hansons processing plant;.GRS dam and wash plant power plants (diesels) audible, Plane,
38.5	39.8	37.0	42.4	<40	Birds, Hansons processing plant;.GRS dam and wash plant power plants (diesels) audible, Plane.

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*) dated 25 July 2014 project noise goal LAeq,15min 40dBA and the draft 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 Pacific Environment Limited and is attached in Appendix 4. All monitoring for air quality is conducted in accordance with the NSW Environmental Protection Agency (EPA).

The weather station was commissioned on 26 June 2015. The valid data recovery rate after all data validation processes was 81% for all parameters excluding 2 m temperature, which stopped recording valid data on 19 November 2015 due to a detachment of the sensor cable and had a resulting valid data recovery rate of 75%. All other sensors went offline on 29 November 2015 due to an issue with the power supply.

The wind rose indicates that from the commissioning of the automatic weather station, monitoring winds from the west are dominant. The average wind speed for the period was 2.1 m/s and the percentage occurrence of calm wind conditions (less than or equal to 0.5 m/s) was 3.9 %.

July was the coldest month on average with October the hottest month on average. The daily average temperature was 9ºC in July, 12ºC in August, 14ºC in September, 19ºC in October and 19ºC in November. A maximum daily average of 30°C was recorded on 20 November 2015.

November recorded the highest monthly rainfall of 377 mm.

The results for the available data in 2015/16 are listed in the following table. Of a possible thirty five samples (over approximately 6 months), twenty seven samples are reported, resulting in a data recovery rate of approximately 77%. The average PM10 concentration over the recorded 6 month period (July to December) was 15.2 µg/m3, compared with the annual EPA impact assessment criterion of 30 µg/m3. All reported results are well within the EPA maximum 24-hour average criterion of 50 µg/m3 for PM10, with a maximum 24-hour average of 31.8 µg/m3 recorded on 10 October 2015. This highest recorded PM10 result was likely to be a result of the Hazard Reduction burn carried out by National Parks and Wildlife Service adjacent to the Grants Rd Quarry site.

The dust sample collected by the HVAS monitor includes both dust generated by site activities (incremental dust impact) and dust from all other local sources (background dust levels). However as stated previously, even with the background levels accounted for, the PM10 levels are considerably below their respective 24-hour and annual criterion.

Table 6 – HVAS Monitoring Results for PM_{10},2015/16

Date	Measured PM_{10} Concentration ($\mu g/m^3$)
15/07/2015	9.2
21/07/2015	9.4
21/07/2015	7.3
2/08/2015	11.8
8/08/2015	16.5
14/08/2015	14.9
20/08/2015	31.5
26/08/2015	9.3
1/09/2015	25.9
7/09/2015	12.7
13/09/2015	23.9

Date	Measured PM_{10} Concentration (µg/m^3)
19/09/2015	10.4
25/09/2015	4.8
3/10/2015	18.0
10/10/2015	31.8
17/10/2015	23.4
24/10/2015	8.2
31/10/2015	15.2
7/11/2015	14.8
14/11/2015	16.7
21/11/2015	15.9
28/11/2015	16.4
12/12/2015	10.0
19/12/2015	27.8
2/01/2016	5.7
22/01/2016	3.5
3/02/2016	16.5
Approximate 6 Month Average a	**15.2 µg/m^3**
Maximum value	**31.8 µg/m^3**

(a) Average for 7 month period, July 2015 to February 2016.

The Air Quality Assessment (AQA) for the Grants Road Sand Quarry Extension was completed by PAEHolmes in 2013, *Air Quality Impact Assessment – Extension of Grants Road Quarry* (PAEHolmes, 2013). The cumulative results predicted in the assessment indicate that the 24-hour PM10 ground level concentrations at the current location of the HVAS would be in the order of 70 µg/m3. The highest measured cumulative 24-hour PM10 concentration was 31.8 µg/m3, a value considerably lower than the conservative predictions made in the air quality assessment. However, these measurements have only been conducted over an approximate six month period to date.

The predicted annual PM10 concentration in the AQA was approximately 30 µg/m3 at the HVAS location, however a concentration (period between July 2015 and February 2016) of 15.2oµg/m3 was measured. This is consistent with the 24-hour results, where the actual concentration has been established to constitute about 50% of the predicted concentration at the same location.

Given the results of the 2015 data, currently no action is required to control environmental performance. Rather it is recommended that current mitigation processes are sustained.

4.4. Groundwater Dependent Ecosystems

A review of the Groundwater Dependent Ecosystems management protocol was undertaken by Conacher Consulting and is attached in Appendix 5. As quarrying activities had not commenced at the time of the reporting period under the Project Approval, detailed monitoring of the Goundwater dependent ecosystems will commence in 2016.

Field inspections of the areas were undertaken prior to recent hazard reduction burns on 9 December 2014. It is recommended that further baseline surveys of the extent and condition of the subject vegetation be undertaken approximately 12 months from the date of the hazard reduction burn operations to allow a proper assessment of the vegetation. This will also coincide with the requirement for annual monitoring under the Groundwater Dependant Ecosystem management plan.

4.5. Somersby Mintbush Monitoring

A baseline assessment of the *Prostanthera junonis* locations previously identified adjacent to the site and described as Population 7 Reservoir Road Brisbane Water National Park was undertaken on 23 October 2015 and 7 November 2015 by Conacher Consulting and is attached in Appendix 6.

No specimens of *Prostanthera junonis* were observed during the surveys as the locations of this species as previously identified had been subject to a targeted hazard reduction burn by National Parks and Wildlife Service. National Parks and Wildlife Service confirmed that a hazard reduction burn was undertaken on 8 to 11 October 2016 with very high to extreme fuel loads, which burnt very well over the three days emitting large smoke plumes. NPWS identified that the fire was limited to within 100m of the subject site, however field surveys identified that the burn was directly adjacent to the site and in some places burnt vegetation within the offset area on the site. Review of the Somersby Mintbush Recovery Plan has identified that the time of the previous fire in this location was 1994.

The previous location of *P. junonis* identified along the Great North Walk track showed noticeable signs of erosion caused by inadequate track maintenance and poor design.

No visible signs of disturbance to *P. junonis* or its habitats were identified as a result of quarry activities.

4.6. Landscape and Rehabilitation Monitoring

The Landscape and Rehabilitation Plan for the project was approved on 11 December 2015. The baseline monitoring report required under the plan is to be provided within 12 months of the plan approval and will be submitted as part of the 2016 Annual reporting.

The review of the landscape and rehabilitation activities prepared by Conacher Consulting and included in Appendix 7 identifies that activities undertaken during the reporting period included the installation of 36 next boxes in accordance with Condition 23 of the Project Approval.

4.7. Heritage

A fence in accordance with the Project Approval was constructed around the Grants Road RE1 Aboriginal Site. In accordance with the Project Approval, monitoring of the site was required one year after the approval or upon the completion of the fence. An inspection was undertaken by Insite Heritage Pty Ltd on 17 July 2015. Details of the inspection are outlined in Appendix 8.

The inspection found that the sandstone block wall, 8m perimeter fencing and signage have been erected as per the draft Cultural Heritage Management Plan and Statement of Commitments. There has been no activity (i.e. ground disturbance works) in the biodiversity offset area that has required a cultural heritage inspection to date.

4.8. Visual

An earth and sound mound has 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.

4.9. Waste Management

The Grants Road Sand Quarry waste management and minimisation strategy for the quarry site has been prepared by Grants Road Sand Quarry and is attached as Appendix 9. 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.

4.10. 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 fire fighting 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. 2016 Reporting Period

The following identifies the measures and activities that are proposed to be undertaken during the 2016 calendar year.

General

- The finalisation of the EMP and sub management plans. These plans will assist in improving the environmental performance.
- 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

- Acquire and install new stainless steel automated water level sensors and data recorders (with telemetry) in four groundwater monitoring bores (BH3, BH4 (G4), DDH1 and DDH2. Abandon monitoring site BH1 (G1). The rationale is site inaccessibility, active quarry operations and close proximity to the site boundary. Installation of new generation water level sensors with telemetry will enable continual assessment of logger integrity, performance and collection of continues real-time reliable data.
- Continue regular routine surface water and groundwater monitoring in the monitoring network during 2016 in accordance with the requirements documented in the surface water and groundwater management plans.
- Submit water samples to the project laboratory 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 2016 monitoring program and an assessment of any trends and potential impacts. This will include an ongoing assessment of hydrographs, pH, TSS and Oils and Grease.

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.
- Carry out the annual monitoring report.

Air Quality

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

Biodiversity

Groundwater Dependent Ecosystem

- Detailed monitoring and reporting of the Goundwater dependent ecosystems will commence in 2016.

Somersby Mintbush

- Further counts of the previously identified locations of *P. junonis*.
- Continuation of suitable erosion and sedimentation controls and maintenance.

Landscape and Rehabilitation

- An additional detailed baseline monitoring report is to be prepared to address the monitoring requirements outlined in the Landscape and Rehabilitation Plan prepared for the project and submitted with the 2016 annual reporting documentation.
- The lodgement of the Conservation and Rehabilitation Bond in accordance with Condition 28 of Schedule 3.

Heritage

- Monitoring and reporting on the Aboriginal sites and the Howes Reserve.
- Consultation with the Aboriginal Land Councils through the preparation of newsletters updating on activities of the Quarry.

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. Further, it has not received any complaints since the approval of the Project Approval 08_0099.

6.2. Non-compliances

A compliance audit was carried out by the Department of Planning & Environment in July 2015 and an independent environmental audit was carried out in August 2015 in accordance with the Planning Approval. Both audits identified that there were minor administrative non-compliances in regards to the lodgement of the reports required under the Planning Approval. Extensions were granted for various reports by the Department and a follow up telephone call and/or email provided when the reports were delayed. The non-compliance is for a period of 4 days, which occurred over the weekend and as noted in both reports was identified as a minor non-compliance.

The compliance audit also noted two observations, which require attention including:

- The housekeeping in the workshop can be improved (refer to Schedule 2, Condition 13(a) and 13(b)). In its current condition, the workshop presents a fire hazard and the risk of trips and falls.
- Two instances of inappropriate bunding of lubricants were observed (refer to Schedule 3, Condition 34).

Grants Road Sand Quarry has taken into consideration the findings of the two audits and is continuously making improvements to the quarry site and its operations. Further, the Directors of the Quarry have implemented a strategy to engage consultants at an earlier date to assist in the preparation and finalisation of reporting to meet the required time period.

6.3. Trends in the monitoring data

Trends in monitoring data will be identified upon once a series of data is available for the quarry expansion. Whilst the quarry under the Project Approval had not commenced during the reporting period, monitoring of the existing quarry will provide initial data to assist in the review for the 2016 Annual review.

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

There have been no discrepancies identified.

Appendix 1
PROJECT APPROVAL 08_0099

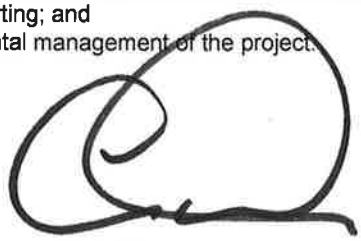
Project Approval

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.

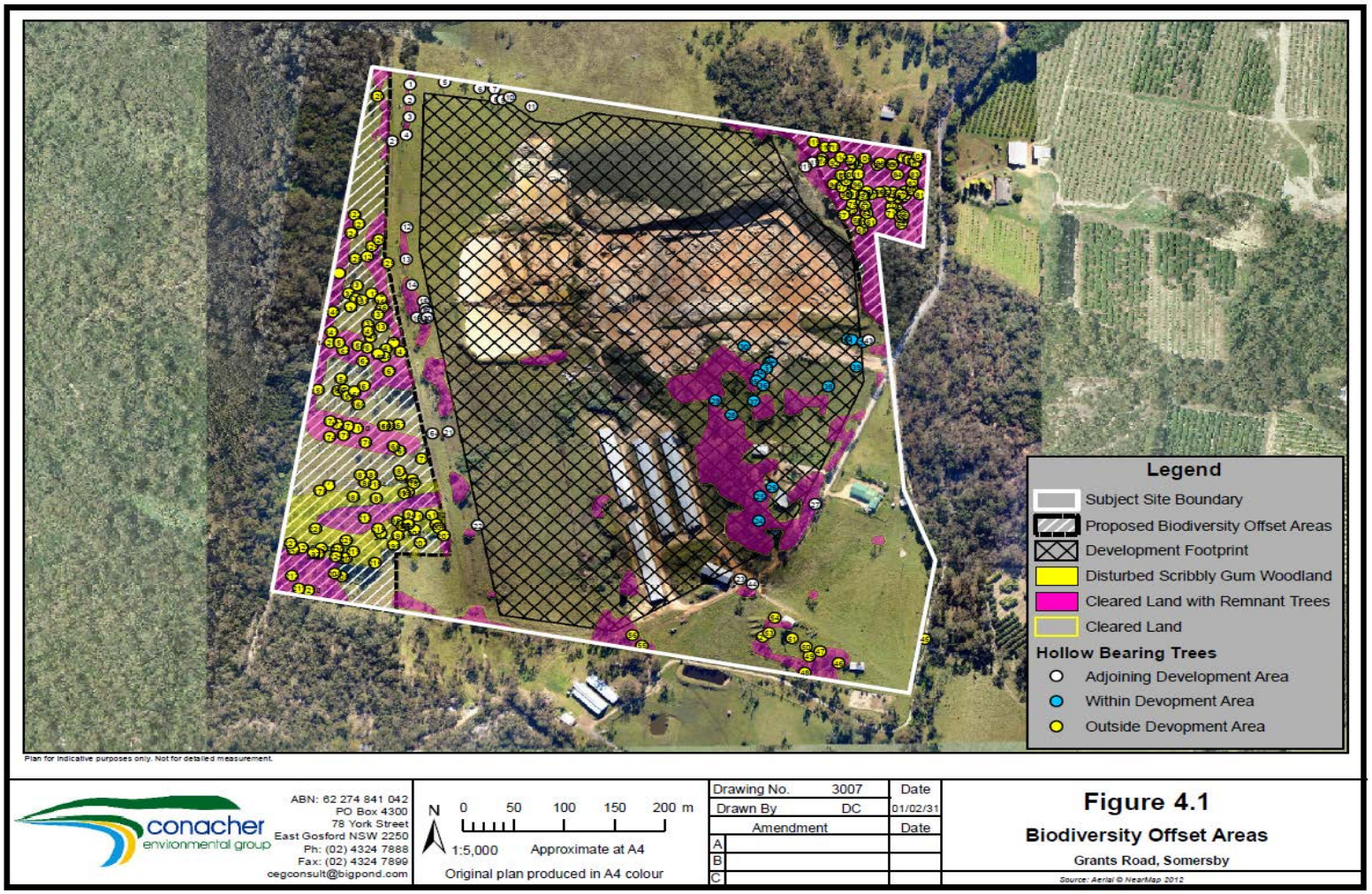
Determination of Meteorological Conditions

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.

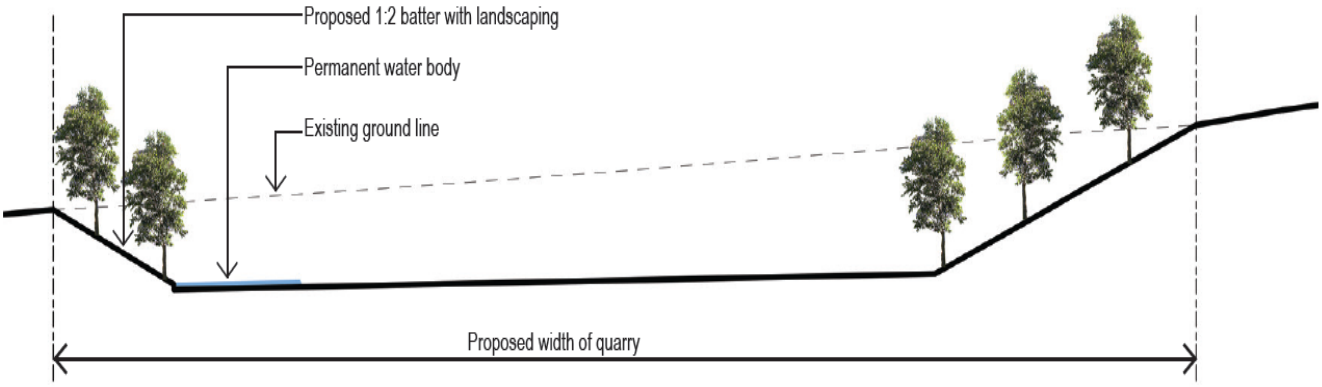
Compliance Monitoring

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
WATER QUALITY MONITORING
Larry Cook Consulting Pty Ltd

Larry Cook Consulting Pty Ltd

WATER MONITORING
PERIOD 1.1.15 – 31.12.15

GRANTS ROAD SAND QUARRY

Grants Road Sand
Lot 1 in DP358717
270 Grants Road Somersby

PREPARED FOR: **GRANTS ROAD SAND**

PROJECT NUMBER: **11017**

DATE: **6TH FEBRUARY 2016**

Larry Cook Consulting
(ABN 27 159 132 055)

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

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1 x PDF	11017-E	Rev.1 Ed.1	6th February 2016	Grants Road Sand

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1.0 INTRODUCTION

1.1 PURPOSE AND OBJECTIVES

Grants Road Sand has state government approval to expand the quarrying operations at Lot 1 in DP358717, 270 Grants Road Somersby (the Site) to produce a range of sand products and high quality hard rock.

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 Lot 1 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	Lot 1 in DP358717
LGA	Gosford City Council

3.0 WATER MONITORING SITES

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

Water level monitoring is undertaken in five 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 groundwater monitoring sites are shown in **Figure 2** and locations of the surface water monitoring sites 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	Process water dam	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
G1 (BH1)	Groundwater	Bore in NE corner of Lot 1	Water quality and automated water level
G4 (BH 4)	Groundwater	Bore on NW corner of decant Pond	Water quality and automated water level
BH 3	Groundwater	Bore in NW corner of Lot 1 (control bore)	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 AUTOMATED WATER LEVEL MEASUREMENTS

Automated measurements of water level were initially collected in a network of five on-site monitoring bores by *Larry Cook Consulting Pty Ltd* in October 2013. *Odyssey* water level data sensors and loggers (pressure transducers) were installed in all five groundwater monitoring bores listed in **Table 2** in 2013. Following non-performance of the data logger in Monitoring Bore DDH1 early in the program, a replacement *Odyssey* logger was installed. This logger also failed (water ingress) and was not replaced. The water level data loggers installed in BH1 (G4) and BH4 (G1) failed in mid 2014 (water ingress) and the logger in DDH2 ceased recording plausible water level and temperature data in about mid 2015.

The *Odyssey* water level data loggers will be replaced with reliable stainless steel, vented pressure transducer sensors with telemetry functionality to bring this monitoring network into line with telemetry already installed on the Site for weather (and other) monitoring. The new water level data loggers have been selected and will be installed in March 2016.

A composite set of hydrographs are presented in **Figure 4**. Rainfall data from the official nearby BOM weather station at Mangrove Mountain (Mangrove Mountain BOM Station No. 061375) is also charted.

The following observations and comments are provided:

- The character of the hydrograph for Monitoring Bore DDH2 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 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 aquifers intersected in the relatively shallow monitoring bores (BH1(G1), BH3 and BH4 (G4)).
- The close correlation between several rain events recorded at nearby Mangrove Mountain and water level rise recorded in shallow monitoring bores (BH1 (G1), BH3 and BH4 (G4)) suggests relative rapid recharge of the shallow aquifer system. This is particularly noticeable in the hydrograph for Control Monitoring Bore BH3 which has the longest recording history (2013-2016). This observation is consistent with the conclusions of extensive groundwater investigations over the Site and surrounding district by *Larry Cook Consulting Pty Ltd* who note that the shallow aquifers will be characterised by a predictably rapid response to any significant rainfall events (direct and immediate recharge).
- No potential impacts from current approved quarrying activities on this aquifer system were detected.

5.0 WATER SAMPLING

Regular water sampling was undertaken in the nominated groundwater monitoring bores and surface water monitoring sites by *Grants Road Sand* during the reporting period 1.1.15 through 31.12.15. Fill-in sampling of surface waters was also undertaken during 2015 by *Larry Cook Consulting*.

A stainless steel bailer was used to sample the two monitoring bores. Latex disposable gloves were used during sample collection and samples stored in laboratory-supplied labelled bottles and chilled in an esky. The samples were submitted to NATA accredited laboratories including ALS, Envirolab and SESL for a suite of prescribed tests and determinations listed in **Table 3** 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 laboratories under Chain of Custody (COC) protocol.

Table 3 **List of Analytes and Tests**
pH
Total Suspended Solids (TSS)
Total Oils and Grease

6.0 QUALITY ASSURANCE & QUALITY CONTROL

6.1 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 4**.

Table 4 **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.

6.2 FIELD QA/QC

The Quality Assurance and Quality Control QA/QC protocols used during the fieldwork are listed in **Table 5**.

Table 5
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.

6.3 LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

The project laboratories used for the tests and chemical analysis of samples during 2015 are all NATA accredited for the selected tests and analysis.

7.0 RESULTS

Laboratory results are summarised in **Table 6**. A copy of the laboratory certificates supplied by *Grants Road Sand* and *Larry Cook Consulting* are provided in **Annexure 1**.

In summary:

- Monitoring Site S1 on the south-western boundary of the Site (set of three discharge pipes) is noted to be dry at different times.
- The **pH** of the surface water (W1 W4 and S1) is slightly acidic to near neutral that reflects rainwater recharge and temporary retention of water within Hawkesbury Sandstone.
- The levels of **oils and grease** tested in surface water samples (W1, W4 and S1) were less than the Limit Of Reporting (LOR) for the various NATA accredited laboratories used in 2015. Measurement of Total Oils and Grease does not specify the hydrocarbon species. The Guidelines for Assessing Service Station Sites. EPA, 1994 was used to compare the results. Because the information needed to establish threshold values is incomplete, a threshold criterion of 10 mg/L was used, as suggested by NSW EPA.

Table 6 Composite Analytical Results

SAMPLE		Guidelines		Method Detection Limit	G3				G4			
DESCRIPTION		Drinking Water - Health Guidelines [1]	Trigger Value for the Protection of Freshwater Aquatic Ecosystems [2] (95% level protection)		Monitoring Bore (Groundwater)				Monitoring Bore (Groundwater)			
DATE					17/6/15	4/8/15	14/8/15	19/10/15	17/6/15	4/8/15	14/8/15	19/10/15
ANALYTE	UNIT											
pH	pH Units	ISD		0.1								
Total Suspended Solids	mg/L			10.0	<10	<10			<10	<10		
Total Oils and Grease[3]	mg/L		10	5.0								

SAMPLE		Guidelines		Method Detection Limit	W1				W4				S1			
DESCRIPTION		Drinking Water - Health Guidelines [1]	Trigger Value for the Protection of Freshwater Aquatic Ecosystems [2]		Surface Water Monitoring Site				Surface Water Monitoring Site				Surface Water Monitoring Site			
DATE					17/6/15	4/8/15	14/8/15	19/10/15	17/6/15	4/8/15	14/8/15	19/10/15	17/6/15	4/8/15	14/8/15	19/10/15
ANALYTE	UNIT															
pH	pH Units	ISD		0.1		7.1	6.1	6.4		6.7	6.5	Dry				6.6
Total Suspended Solids	mg/L			10.0	<10	<10	7	6	<10	<10	<5	Dry	<10			<5
Total Oils and Grease[3]	mg/L			5.0		<5	<10	<5		<5	<10	Dry				<5

[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)

[3] **Guidelines for Assessing Service Station Sites. EPA, 1994.** Information needed to establish threshold values is incomplete. A threshold criterion of 10 mg/L is suggested by EPA.

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

- The concentration of **Total Suspended Solids (TSS)** recorded in the two groundwater monitoring bores (G1 and G4) and in the surface water monitoring sites W4 and S1 were less than the LOR. The exception is surface water monitoring site W1 which returned levels either less than the LOR or at low concentrations (7 mg/L in August 2015 and 6 mg/L in October 2015).
- No potential impacts from current approved quarrying activities on this aquifer system were detected.

8.0 DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

Based on the results of surface water and groundwater testing obtained during the period 1.1.15 through 31.12.15, the following discussion, conclusions and recommendations are provided.

GEOCHEMISTRY

- The **pH** of the surface water sampled is slightly acidic to near neutral that reflects rainwater recharge over the quarry precinct and potential mixing with local groundwater hosted by the Hawkesbury Sandstone.
- The levels of **oils and grease** tested in surface water samples were less than the LOR.
- The concentration of **Total Suspended Solids (TSS)** recorded in groundwater samples were all less than the LOR. TSS recorded in the surface water samples were either less than the LOR or at low concentrations.
- No potential impacts from current approved quarrying activities on this aquifer system were detected.

WATER LEVEL MONITORING

- The close correlation between several rain events and water level rise recorded in shallow monitoring bores suggests relative rapid recharge of the shallow aquifer system. This is consistent with the results of extensive groundwater investigations over the Site and surrounding district.
- The hydrograph for relatively deeper monitoring bore also shows a direct response to rainfall events but with a more subdued magnitude.
- No potential impacts from current approved quarrying activities on this aquifer system were detected.

RECOMMENDATIONS

- Acquire and install new stainless steel automated water level sensors and data recorders (with telemetry) in four groundwater monitoring bores (BH3, BH4 (G4), DDH1 and DDH2. Abandon monitoring site BH1 (G1). The rationale is site inaccessibility, active quarry operations and close proximity to the site boundary. Installation of new generation water level sensors with telemetry will enable continual assessment of logger integrity, performance and collection of continues real-time reliable data.
- Continue regular routine surface water and groundwater monitoring in the monitoring network during 2016 in accordance with the requirements documented in the surface water and groundwater management plans.
- Submit water samples to the project laboratory 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 2016 monitoring program and an assessment of any trends and potential impacts. This will include an ongoing assessment of hydrographs, pH, TSS and Oils and Grease.

For and on behalf of
Larry Cook Consulting

Larry Cook
Hydrogeologist

ANNEXURES

Annexure 1

Laboratory Certificates

SESL AUSTRALIA
Environment & Soil Sciences

Multiple Analysis Profile

Sample Drop Off: 16 Chilvers Road
Thornleigh NSW 2120
Tel: 1300 30 40 80
Fax: 1300 64 46 89

Mailing Address: PO Box 357
Pennant Hills NSW 1715
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 35201 **Sample N°: 1** **Date Instructions Received: 17/6/15** **Report Status: ○ Draft ◉ Final**

Client Name: **GR & AK Jones**
Client Contact: **Steven Jones**
Client Job N°:
Client Order N°:
Address: **270 Grants Rd**
Somersby NSW 2250

Project Name: **Grants Rd Sand Water testing**
SESL Quote N°:
Sample Name: **G3**
Description: **Water**
Test Type: **TSS**

Analysis	Unit	Result
Total Suspended Solids	mg/kg	<10

Analysed by SESL Australia NATA #15633

Consultant:
Andrew Jacovides

Authorised Signatory:
Ryan Jacka

Date Report Generated
24/06/2015

SESL AUSTRALIA
Environment & Soil Sciences

Multiple Analysis Profile

Sample Drop Off: 16 Chilvers Road
Thornleigh NSW 2120
Tel: 1300 30 40 80
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Batch N°: 35201 **Sample N°: 2** **Date Instructions Received: 17/6/15** **Report Status:** ○ Draft ◉ Final

Client Name: **GR & AK Jones**
Client Contact: **Steven Jones**
Client Job N°:
Client Order N°:
Address: **270 Grants Rd**
Somersby NSW 2250

Project Name: **Grants Rd Sand Water testing**
SESL Quote N°:
Sample Name: **G4**
Description: **Water**
Test Type: **TSS**

Analysis	Unit	Result
Total Suspended Solids	mg/kg	<10

Analysed by SESL Australia NATA #15633

Consultant: Andrew Jacovides

Authorised Signatory: Ryan Jacka

Date Report Generated
24/06/2015

Multiple Analysis Profile

Sample Drop Off: 16 Chilvers Road
Thornleigh NSW 2120

Mailing Address: PO Box 357
Pennant Hills NSW 1715

Tel: 1300 30 40 80
Fax: 1300 64 46 89
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 35201 **Sample N°: 3** **Date Instructions Received: 17/6/15** **Report Status:** ○ Draft ◉ Final

Client Name: **GR & AK Jones**
Client Contact: **Steven Jones**
Client Job N°:
Client Order N°:
Address: **270 Grants Rd**
Somersby NSW 2250

Project Name: **Grants Rd Sand Water testing**
SESL Quote N°:
Sample Name: **W1**
Description: **Water**
Test Type: **TSS**

Analysis	Unit	Result
Total Suspended Solids	mg/kg	<10

Analysed by SESL Australia NATA #15633

Consultant: Andrew Jacovides

Authorised Signatory: Ryan Jacka

Date Report Generated
24/06/2015

SESL AUSTRALIA
Environment & Soil Sciences

Multiple Analysis Profile

Sample Drop Off: 16 Chilvers Road
Thornleigh NSW 2120
Tel: 1300 30 40 80
Fax: 1300 64 46 89

Mailing Address: PO Box 357
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Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 35201 **Sample N°: 4** **Date Instructions Received: 17/6/15** **Report Status: ○ Draft ◉ Final**

Client Name: **GR & AK Jones**
Client Contact: **Steven Jones**
Client Job N°:
Client Order N°:
Address: **270 Grants Rd**
Somersby NSW 2250

Project Name: **Grants Rd Sand Water testing**
SESL Quote N°:
Sample Name: **W4**
Description: **Water**
Test Type: **TSS**

Analysis	Unit	Result
Total Suspended Solids	mg/kg	<10

Analysed by SESL Australia NATA #15633

Consultant: Andrew Jacovides

Authorised Signatory: Ryan Jacka

Date Report Generated
24/06/2015

SESL AUSTRALIA
Environment & Soil Sciences

Multiple Analysis Profile

Sample Drop Off: 16 Chilvers Road
Thornleigh NSW 2120
Tel: 1300 30 40 80
Fax: 1300 64 46 89

Mailing Address: PO Box 357
Pennant Hills NSW 1715
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 35823 **Sample N°: 1** **Date Instructions Received: 4/8/15** **Report Status: ○ Draft ◉ Final**

Client Name: **GR & AK Jones**
Client Contact: **Steven Jones**
Client Job N°:
Client Order N°:
Address: **270 Grants Rd**
Somersby NSW 2250

Project Name: **Grants Rd Sand**
SESL Quote N°:
Sample Name: **W1**
Description: **Water**
Test Type: **pH_W, TSS, TOG**

Analysis	Unit	Result
pH	pH unit	7.1
Total Suspended Solids	mg/L	<10
Total Oil and Grease	mg/L	<5

Analysed by SESL Australia NATA #15633
Analysed by SGS Australia Pty Ltd (Alexandria) Report # SE142115

No commentary requested.

Consultant: Andrew Jacovides

Authorised Signatory: Kelly Lee

Date Report Generated
12/08/2015

SESL AUSTRALIA
Environment & Soil Sciences

Multiple Analysis Profile

Sample Drop Off: 16 Chilvers Road
Thornleigh NSW 2120
Tel: 1300 30 40 80
Fax: 1300 64 46 89

Mailing Address: PO Box 357
Pennant Hills NSW 1715
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 35823 **Sample N°: 2** **Date Instructions Received: 4/8/15** **Report Status: ○ Draft ◉ Final**

Client Name: **GR & AK Jones**
Client Contact: **Steven Jones**
Client Job N°:
Client Order N°:
Address: **270 Grants Rd**
Somersby NSW 2250

Project Name: **Grants Rd Sand**
SESL Quote N°:
Sample Name: **W4**
Description: **Water**
Test Type: **pH_W, TSS, TOG**

Analysis	Unit	Result
pH	pH unit	6.7
Total Suspended Solids	mg/L	<10
Total Oil and Grease	mg/L	<5

Analysed by SESL Australia NATA #15633
Analysed by SGS Australia Pty Ltd (Alexandria) Report # SE142115

No commentary requested.

Consultant: Andrew Jacovides

Authorised Signatory: Kelly Lee

Date Report Generated
12/08/2015

SESL AUSTRALIA
Environment & Soil Sciences

Multiple Analysis Profile

Sample Drop Off: 16 Chilvers Road
Thornleigh NSW 2120
Tel: 1300 30 40 80
Fax: 1300 64 46 89

Mailing Address: PO Box 357
Pennant Hills NSW 1715
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 35823 **Sample N°: 3** **Date Instructions Received: 4/8/15** **Report Status: ○ Draft ◉ Final**

Client Name: **GR & AK Jones**
Client Contact: **Steven Jones**
Client Job N°:
Client Order N°:
Address: **270 Grants Rd**
Somersby NSW 2250

Project Name: **Grants Rd Sand**
SESL Quote N°:
Sample Name: **G3**
Description: **Water**
Test Type: **TSS**

Analysis	Unit	Result
Total Suspended Solids	mg/L	<10

Analysed by SESL Australia NATA #15633

No commentary requested.

Consultant: Andrew Jacovides

Authorised Signatory: Kelly Lee

Date Report Generated
12/08/2015

SESL AUSTRALIA
Environment & Soil Sciences

Multiple Analysis Profile

Sample Drop Off: 16 Chilvers Road
Thornleigh NSW 2120
Tel: 1300 30 40 80
Fax: 1300 64 46 89

Mailing Address: PO Box 357
Pennant Hills NSW 1715
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 35823 **Sample N°: 4** **Date Instructions Received: 4/8/15** **Report Status: ○ Draft ◉ Final**

Client Name: **GR & AK Jones**
Client Contact: **Steven Jones**
Client Job N°:
Client Order N°:
Address: **270 Grants Rd**
Somersby NSW 2250

Project Name: **Grants Rd Sand**
SESL Quote N°:
Sample Name: **G4**
Description: **Water**
Test Type: **TSS**

Analysis	Unit	Result
Total Suspended Solids	mg/L	<10

Analysed by SESL Australia NATA #15633

No commentary requested.

Consultant: Andrew Jacovides

Authorised Signatory: Kelly Lee

Date Report Generated
12/08/2015

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 132757

Client:

Larry Cook Consulting
PO Box 8146
Tumbi Umbi
NSW 2261

Attention: Larry Cook

Sample log in details:

Your Reference:	**Grants Road**		
No. of samples:	2 Waters		
Date samples received / completed instructions received	14/08/2015	/	14/08/2015

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	21/08/15	/	21/08/15
Date of Preliminary Report:	Not Issued		

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Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics			
Our Reference:	UNITS	132757-1	132757-2
Your Reference	----------	W1	W4
Date Sampled	----------	6/08/2015	6/08/2015
Type of sample		Water	Water
Date prepared	-	14/08/2015	14/08/2015
Date analysed	-	14/08/2015	14/08/2015
pH	pH Units	6.1	6.5
Total Suspended Solids	mg/L	7	<5
Oil & Grease (LLE)	mg/L	<10	<10

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-019	Suspended Solids - determined gravimetrcially by filtration of the sample. The samples are dried at 104+/-5oC.
Inorg-003	Oil & Grease - determine gravimetrically following extraction with Hexane, in accordance with APHA latest edition, 5220-B.

Client Reference: Grants Road

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			14/08/2015	132757-2	14/08/2015 || 14/08/2015	LCS-W1	14/08/2015
Date analysed	-			14/08/2015	132757-2	14/08/2015 || 14/08/2015	LCS-W1	14/08/2015
pH	pH Units		Inorg-001	[NT]	132757-2	6.5 || [N/T]	LCS-W1	101%
Total Suspended Solids	mg/L	5	Inorg-019	<5	132757-2	<5 || <5	LCS-W1	105%
Oil & Grease (LLE)	mg/L	5	Inorg-003	<5	132757-2	<10 || [N/T]	LCS-W1	87%

Report Comments:

Oil and Grease:The PQL has been raised due to the limited amount of sample/s available for testing.

Samples were contained in plastic bottle. This may cause negative biased on the final results

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

To: SESL Australia
16 Chivers Road
Thornleigh NSW 2120

CHAIN OF CUSTODY

Date: 11.8.15 Page: 1 of 1

REPORT TO:	G.R & A.K Jones
COMPANY:	
ADDRESS:	Grants Road SOMERSBY NSW 2250
INVOICE TO:	G.R & A.K Jones
COMPANY:	
ADDRESS:	Grants Road SOMERSBY NSW 2250
Telephone:	0428 884645
Email:	larrycookconsulting@gmail.com

ANALYSIS REQUIRED

ENVIROLAB GROUP

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 132757
Date Received: 14/8/15
Time Received: 15:30
Received by: JY/4
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Client Sample ID	Sample Date	Matrix	TSS	pH	TOG
1- W1	6.8.15	Water	X	X	X
2- W4	6.8.15	Water	X	X	X

Project ID	Relinquished By:	Date/Time	Received By:	Date/Time
Grants Road Sand Water Testing				14/8/15. 15:30
	Relinquished By:	Date/Time	Received By:	Date/Time
	Relinquished By:	Date/Time	Received By:	Date/Time

Comments:

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 136074

Client:

Larry Cook & Associates
PO Box 8146
TUMBI UMBI
NSW 2261

Attention: Larry Cook

Sample log in details:

Your Reference:	**Larry Cook - Grants Road Sand Water Testing**
No. of samples:	2 Waters
Date samples received / completed instructions received	19/10/2015 / 19/10/2015

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	26/10/15 / 2/11/15
Date of Preliminary Report:	Not issued

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Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics			
Our Reference:	UNITS	136074-1	136074-2
Your Reference	----------	W1	S1
Date Sampled	----------	15/10/2015	15/10/2015
Type of sample		Water	Water
Date prepared	-	19/10/2015	19/10/2015
Date analysed	-	19/10/2015	19/10/2015
pH	pH Units	6.4	6.6
Total Suspended Solids	mg/L	6	<5
Oil & Grease (LLE)	mg/L	<5	<5

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-019	Suspended Solids - determined gravimetrcially by filtration of the sample. The samples are dried at 104+/-5oC.
Inorg-003	Oil & Grease - determine gravimetrically following extraction with Hexane, in accordance with APHA latest edition, 5220-B.

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			19/10/2015	[NT]	[NT]	LCS-1	19/10/2015
Date analysed	-			19/10/2015	[NT]	[NT]	LCS-1	19/10/2015
pH	pH Units		Inorg-001	[NT]	[NT]	[NT]	LCS-1	101%
Total Suspended Solids	mg/L	5	Inorg-019	<5	[NT]	[NT]	LCS-1	117%
Oil & Grease (LLE)	mg/L	5	Inorg-003	<5	[NT]	[NT]	LCS-1	92%

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

To: Envirolab Services Pty Ltd
12 Ashley Street
Chatswood NSW 2147

CHAIN OF CUSTODY

Date: 15.10.15 Page: 1 of 1

REPORT TO:	Larry Cook
COMPANY:	Larry Cook Consulting
ADDRESS:	PO Box 8146 TUMBI UMBI NSW 2261
INVOICE TO:	Larry Cook
COMPANY:	Larry Cook Consulting
ADDRESS:	PO Box 8146 TUMBI UMBI NSW 2261
Telephone:	0428 884645
Email:	larrycookconsulting@gmail.com

ANALYSIS REQUIRED

	Client Sample ID	Sample Date	Matrix	TSS	pH	TOG
1	W1		WATER	x	x	x
2	S1	15.10.15	WATER	x	x	x
	—	15.10.15	—			

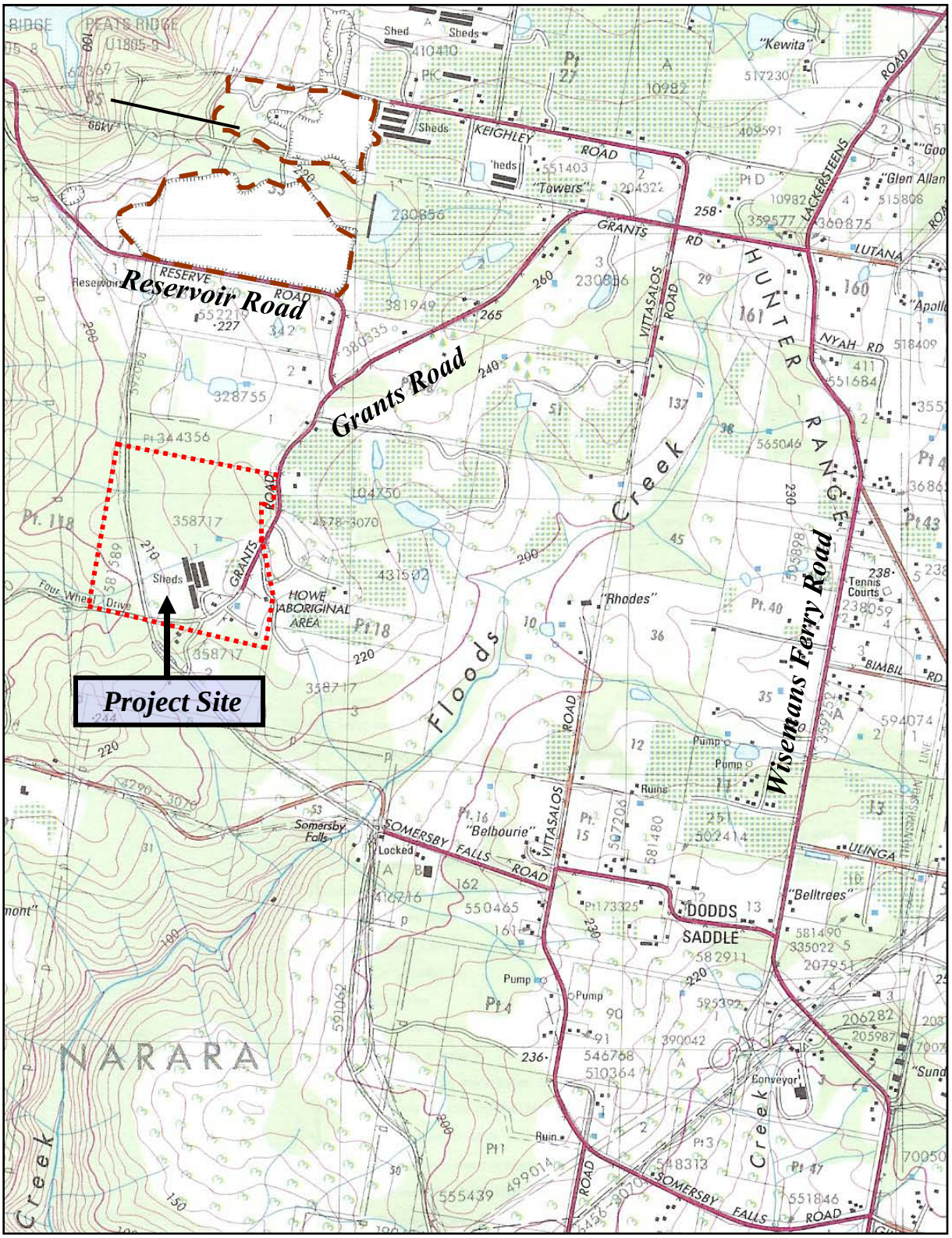
ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 136074
Date Received: 19/10/15
Time Received: 10:00
Received by: D-F
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Project ID	Relinquished By:	Date/Time	Received By:	Date/Time
GRANTS ROAD SAND WATER TESTING.			Daniel Ford - ELS	19/10/15 10:00
	Relinquished By:	Date/Time	Received By:	Date/Time
	Relinquished By:	Date/Time	Received By:	Date/Time

Comments:

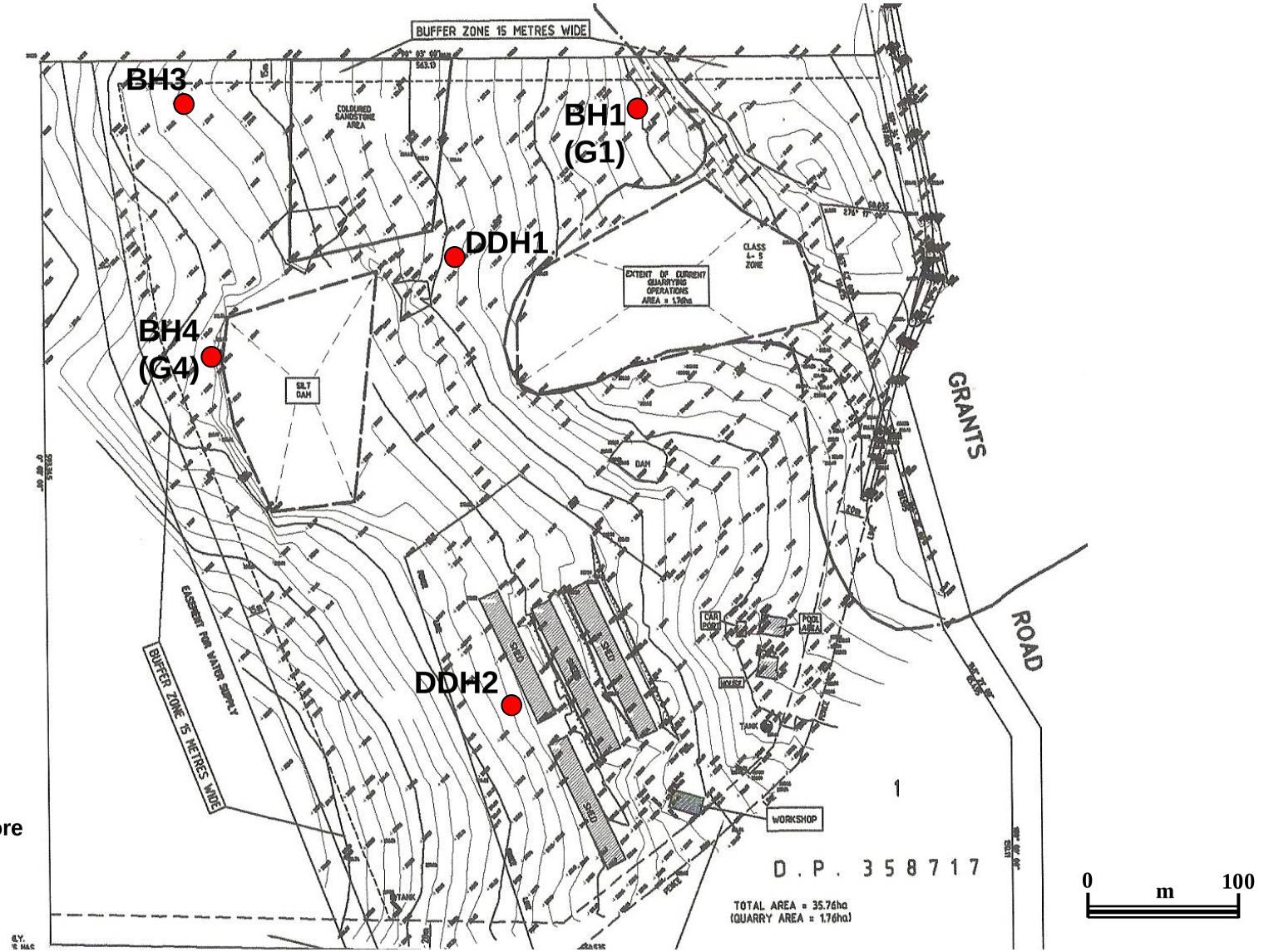
Figures



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

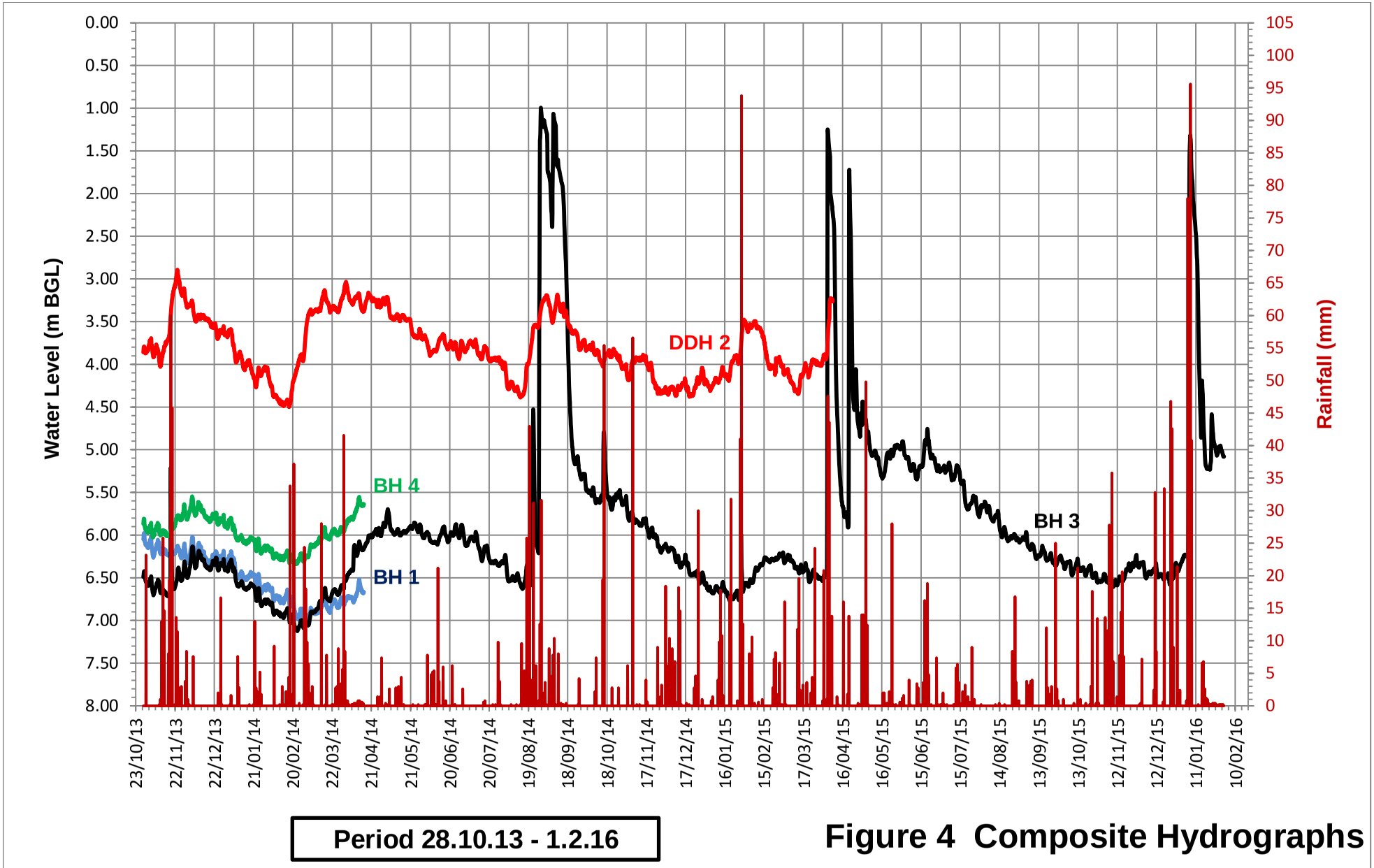
Modified after Umwelt 2013

Larry Cook Consulting **PO Box 8146** **Tumbi Umbi NSW 2261** **Ph 02 4340 0193**	**Grants Road Sand Quarry Extension** Locations of Monitoring Sites	N	Scale: As shown **FIGURE 2**



● Existing Monitoring Bore

Larry Cook Consulting **PO Box 8146** **Tumbi Umbi NSW 2261** **Ph 02 4340 0193**	**Grants Road Sand Quarry Expansion** Site Plan Approximate Positions of Monitoring Bores	N	Scale: As shown **FIGURE 3**



Period 28.10.13 - 1.2.16

Figure 4 Composite Hydrographs

Appendix 3
NOISE AUDIT
Atkins Acoustics and Associates Pty Ltd

46.7029.R1:GA/DT/2016

ATKINS ACOUSTICS

Postal Address
P.O. Box 432
Gladesville
N.S.W. 1675
AUSTRALIA
A.C.N. 068 727 195
A.B.N. 19 068 727 195
Telephone: 02 9879 4544
Fax: 02 9879 4810
Email: AtkinsAcoustics@bigpond.com.au

Grants Road Sand Pty Ltd.
Grants Road
SOMERSBY NSW 2250

Attention: Steve Jones

24 January 2016

Atkins Acoustics and Associates Pty Ltd.
Consulting Acoustical & Vibration Engineers

SITE ATTENDED NOISE AUDIT GRANTS ROAD SAND QUARRY SOMERSBY

1.0 INTRODUCTION

Atkins Acoustics was requested by Grants Road Sand Pty Ltd to undertake an environmental noise audit of the Grants Road Sand Quarry operations. The site is identified as 270 Grants Road, Somersby (Lot 1 DP 358717). The audit was conducted by Graham Atkins, Grahams qualifications and membership include BE; MAAS, MIEAust, CPEng and MINCE. Graham is employed by Atkins Acoustics and Associates Pty Ltd a Member Firm of the AAAC.

The approval included extraction, processing and transportation of up to 250,000 tonnes per annum of various quarry products until 30 June 2044.The site currently operates under approval from DoPE dated 25 July 2014 (08_0099). Specific noise conditions (Schedule 3 - Conditions 5, 6, 7, 8 & 9) contained within the consent include the requirement for preparation of a *NMP* (*Schedule 3 - Condition 9*) to the satisfaction of the Secretary.

The approval includes:

- Extraction, processing and transportation of up to 250,000 tonnes per annum of various grades of washed sand, mortar sand, sandstone blocks and retaining wall rocks for a period of approximately thirty (30) years.
- Total extraction of approximately nine point five (9.5) million tonnes (Mt) of extractable sand and sandstone.
- Extension of quarry by approximately twenty (20) hectares.
- Extraction to depth of thirty-five (35) metres.
- Extraction by dozer and excavator.

The site operates from 7.00am to 6.00pm Monday to Friday and 7.00am to 1.00 pm Saturday. Due to the number of quarry staff, simultaneous plant operation is typically limited to three (3) items at any one time.

2.0 APPROVAL CONDITIONS (Noise)

Project construction and quarry operational noise conditions imposed by the DoPE (*Approval 08_0099*) dated 25 July 2014 – Schedule 3 are presented below:

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.

It is noted that *Schedule 3 – Condition 7* does not provide noise limits for the National Park. In accordance with the EA Noise Assessment and procedures of the *NSW, INP* a level of $L_{Aeq,15min}$ 50-55dB(A) is applied for the National Park.

.

3.0 DESCRIPTION OF QUARRING ACTIVITIES

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

- Wet Sand Wash Plant in western portion of Area A
- Commander Screen and Loader 1 on upper processing area within western portion of Area A.
- Truck 1 route between upper processing area and site entry.
- Stone saw in central portion of Area A.

4.0 SITE ATTENDED NOISE AUDIT

Site inspection and attended noise audits were conducted between 8.30am and 1.45pm on Monday 18 January 2016. Weather conditions during the audit were clear and dry with calm to light breeze from the south (1-2m/sec).

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 (45.6920.R1.NMP:CFCD7. Rev 02) dated September 2015.

The reference measurement locations are shown in *Attachment 1* and identified as:

Location 1: 'Ibels' - 380 Somersby Falls Road

Location 2: 'McGregor' - 239 Grants Road

Location 3: 'Sammut' - 210 Grants Road

4.1 Measurement Instrumentation

The noise measurement instrumentation selected comprised a SVAN949 Sound and Vibration Analyzer. The meter was programmed to calculate and record 15 minute statistical levels. The reference calibration level of the meter was checked prior to and after the measurements with a Bruel & Kjaer Sound Level Calibrator Type 4230 and remained within ± 0.5dBA. The meter carried appropriate and current NATA calibration *(Attachment 2).*

The noise audit and measurements were undertaken in accordance with procedures documented in Australian Standard AS1055-1997 ' Acoustics - Description and Measurement of Environmental Noise' and the NSW Environmental Protection Authority Industrial Noise Policy *(INP).*

4.2 Weather Conditions

Weather conditions during the audit varied from calm to light variable winds from the south (1-2m/sec). The day temperatures ranged between 20°C and 27°C. No rainfall was recorded during the audit.

5.0 MEASUREMENT RESULTS

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 is presented in *Table 1*.

Table 1: Audit Measurement Results
dBA re: 20 x 10^{-6} Pa

Measured Ambient Sound Pressure Levels dBA				Grants Road Sand Contribution $L_{Aeq, 15min*}$	Comments
L_{Aeq}	L_{A10}	L_{A90}	L_{A1}		
Location 1: Ibels Residence – 380 Somersby Falls Road					
40.4	40.6	29.8	53.9	<30	Local domestic, birds, distant traffic, insects. GRS inaudible,
41.2	41.3	29.6	51.3	<30	Local domestic, birds, distant traffic, insects. GRS inaudible,
Location 2: McGregor Residence – 239 Grants Road					
42.1	44.6	34.7	53.0	<35	Local domestic, Motorway traffic, insects, Hanson trucks; GRS inaudible
44.8	47.5	39.0	53.7	<35	Local domestic, distant traffic, insects. Hanson trucks; GRS occasionally audible (saw cutting),
Location 3: Sammut Residence – 210 Grants Road					
51.5	56.0	38.6	62.5	<35	Local domestic, birds, insects, Hanson trucks. GRS inaudible. (noise controlled by birds),
38.5	41.5	35.2	45.8	<35	Local domestic, distant traffic, insects. Hanson trucks; GRS inaudible,
Location 4: National Park					
39.3	40.9	37.2	44.0	<40	Birds, Hansons processing plant;.GRS dam and wash plant power plants (diesels) audible, Plane
38.5	39.8	37.0	42.4	<40	Birds, Hansons processing plant;.GRS dam and wash plant power plants (diesels) audible, Plane

In addition to the measurements at the residential receivers, on-site measurements have been conducted to confirm sound power levels for the plant and equipment. *Table 2* provides a summary of the measurement results.

Table 2: Quarry Plant and Equipment Sound Power Levels
dBA re: 10^{-12} Watts

Plant Description	Sound Power Level dB 10-12 Watts									
	dB(A)	31.5	63	125	250	500	1k	2k	4k	8k
Settling Pond Pump	105	94	100	107	93	97	102	101	93	87
Cat 365C - Saw Cutting	114	95	103	102	101	104	103	106	106	110
Sand Wash Plant Motor	95	100	113	100	93	90	91	86	80	73
Power Screen	112	102	96	98	96	104	108	108	101	95
Sand Wash Plant Pump	104	89	114	100	96	99	99	98	93	85
Cat Loader 972G	102	102	116	105	104	100	97	95	87	79
Tricon Screen	109	105	103	108	106	106	104	103	98	93

The audit measurements have confirmed that operational noise contributions from Grants Road Sand Quarry operations satisfied the (*Approval 08_0099*) dated 25 July 2014 project noise goal $L_{Aeq,\ 15min}$ 40dBA and the NMP recommended limit for the National Park $L_{Aeq,15min}$ 50-55.

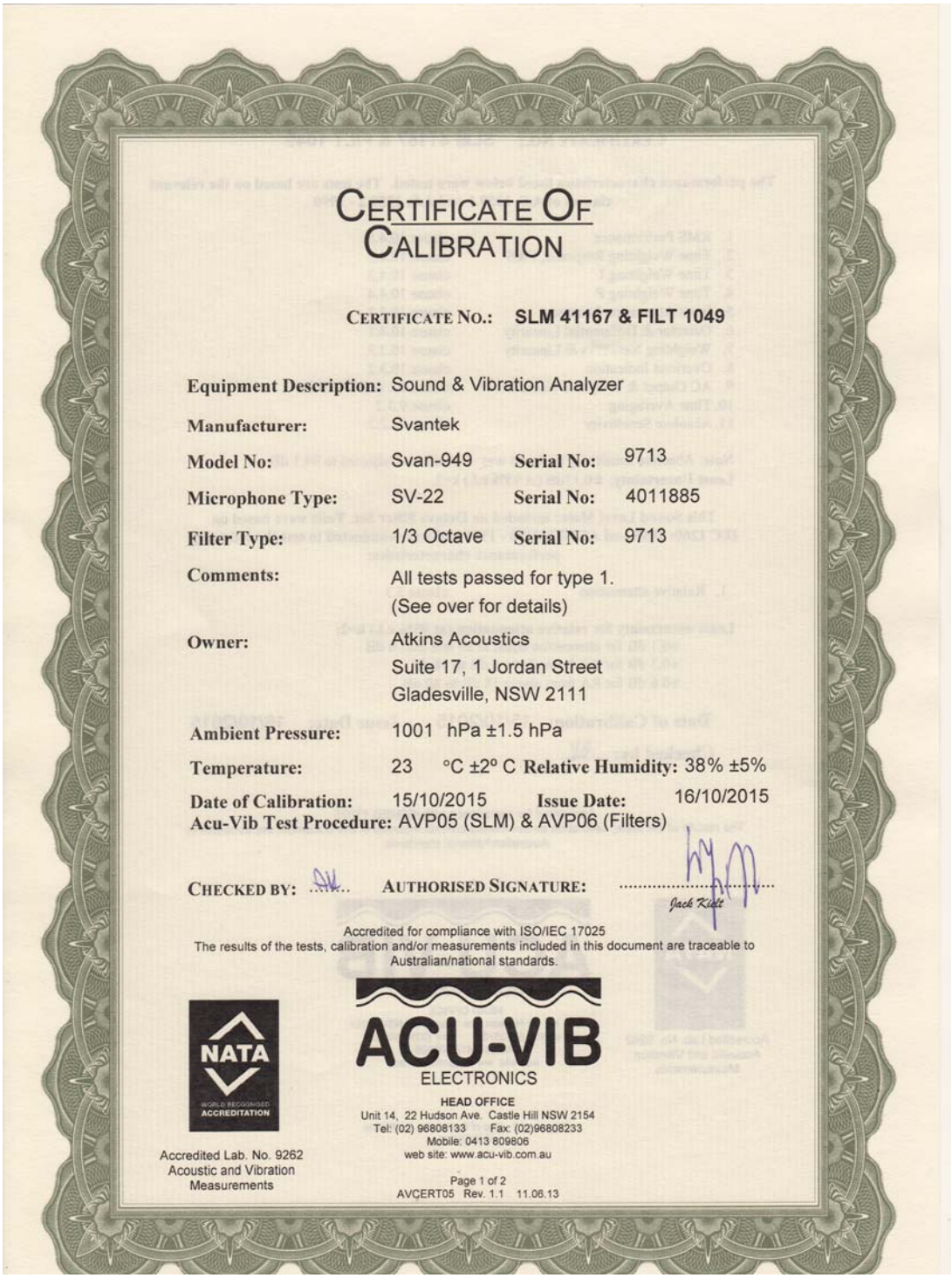
We trust the information in this letter is satisfactory. Please do not hesitate to contact our office if further information or clarification is required.

Yours sincerely,
ATKINS ACOUSTICS & ASSOCIATES PTY LTD.

Graham Atkins

ATTACHMENT 1: ASSESSMENT MONITORING LOCATIONS

ATTACHMENT 2: SVAN Certificate of Calibration.



CERTIFICATE OF CALIBRATION

CERTIFICATE NO.: SLM 41167 & FILT 1049

Equipment Description:	Sound & Vibration Analyzer		
Manufacturer:	Svantek		
Model No:	Svan-949	**Serial No:**	9713
Microphone Type:	SV-22	**Serial No:**	4011885
Filter Type:	1/3 Octave	**Serial No:**	9713
Comments:	All tests passed for type 1. (See over for details)		
Owner:	Atkins Acoustics Suite 17, 1 Jordan Street Gladesville, NSW 2111		
Ambient Pressure:	1001 hPa ±1.5 hPa		
Temperature:	23 °C ±2° C	**Relative Humidity:**	38% ±5%
Date of Calibration:	15/10/2015	**Issue Date:**	16/10/2015
Acu-Vib Test Procedure:	AVP05 (SLM) & AVP06 (Filters)		

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

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

NATA
WORLD RECOGNISED ACCREDITATION
Accredited Lab. No. 9262
Acoustic and Vibration Measurements

ACU-VIB
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AVCERT05 Rev. 1.1 11.06.13

Appendix 4

BASELINE AIR QUALITY MONITORING

Pacific Environment Operations Pty Ltd

Pacific Environment Limited

Consulting • Technologies • Monitoring • Toxicology

Report

BASELINE MONITORING ANNUAL REPORT – 2015

GRANTS ROAD SAND

Job ID. 20078D

11 March 2016

PROJECT NAME:	Baseline Monitoring Annual Report – 2015
JOB ID:	20078D
DOCUMENT CONTROL NUMBER	AQ-NW-002-20078D
PREPARED FOR:	Grants Road Sand
APPROVED FOR RELEASE BY:	Jane Barnett
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DOCUMENT CONTROL

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1	01/03/2016	Baseline Report (Draft)	Sam Oswald Angelo Rouggos	Jane Barnett
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List of Figures

List of Tables

1 INTRODUCTION

Pacific Environment has been commissioned by Grants Road Sand to undertake baseline air quality and meteorological reporting for the Grants Road Sand Quarry, located in the NSW Central Coast at Somersby, NSW.

The results of the monitoring programs are provided on an annual basis. This report summarises the data collected during the July to December 2015 period.

2 RELEVANT MONITORING GUIDELINES AND STANDARDS

2.1 Air Quality Monitoring Guidelines

All monitoring for air quality is conducted in accordance with the NSW Environmental Protection Agency (EPA)[a] "*Approved methods for the sampling and analysis of air pollutants in NSW*" (**NSW DEC 2005**).

Specifically, the approved methods relevant to this monitoring plan are:

- AM-1 – Guide for the siting of sampling equipment.
- AM-2 – Guide for measurement of horizontal wind for air quality applications.
- AM-4 – Meteorological monitoring guidance for regulatory modelling applications; and
- AM-18 – Particulate matter – PM_{10} – high volume sampler with size-selective inlet.

2.1.1 General Siting Requirements

AM-1 refers to the Australian Standard (AS) 2922 – 1987, however this has been superseded by AS/NZS 3580.1.1:2007 *Methods for sampling and analysis of ambient air - Guide to siting air monitoring equipment*.

The siting of all instrumentation is undertaken in accordance with the requirements set out in both AS 2922 - 1987 and AS 3580.1.1: 2007. Where conflicts arise, preference will be given to the more recent standard.

2.1.2 Meteorological Monitoring

AM-2 refers to the Australian Standard AS 2923 – 1987 "Ambient Air – Guide for Measurement of Horizontal Wind for Air Quality Applications". AS 2923 applies to the determination of wind speed and direction for the purpose of air quality applications and sets out requirements for apparatus, calibration and maintenance, siting and installation and data recording and processing (including appropriate methods for wind averaging). A monitoring site for the meteorological station (met station) was chosen in accordance with AS 2923 – 1987. The location is away from buildings or other obstructions that would otherwise impact on the prevailing wind flow.

A summary of the parameters measured is shown in **Table 2-1**.

[a] The NSW EPA exists as a legal entity operated within the Office of Environment and Heritage (OEH) which came into existence in April 2011. OEH was previously part of the Department of Environment, Climate Change and Water (DECCW). The DECCW was also recently known as the Department of Environment and Climate Change (DECC), and prior to that the Department of Environment and Conservation (DEC). The terms NSW EPA, OEH, DECCW, DECC and DEC are interchangeable in this report.

Table 2-1: Weather Station Parameters

Parameter	Unit	Frequency	Averaging Period	Sampling Method
Rainfall	mm	Continuous	1 Hour	AM-4
Temperature @ 2 m	°C		10 Minute	AM-4
Temperature @ 10 m	°C			AM-2 and AM-4
Wind Speed @ 10 m	m/s			AM-2 and AM-4
Wind Direction @ 10 m	Degrees			AM-2 and AM-4
Sigma Theta	Degrees			AM-2 and AM-4
Relative Humidity	%			AM-4
Solar Radiation	W/m^2			AM-4

2.1.3 Particulate Matter Monitoring

AM-18 refers to the Australian Standard (AS) 3580.9.6:1990, however this has been superseded by AS/NZS 3580.9.6:2015 *Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM_{10} high volume sampler with size elective inlet – Gravimetric method*.

PM_{10} refers to all particles with equivalent aerodynamic diameters of less than 10 µm, that is, all particles that behave aerodynamically in the same way as spherical particles with a unit density.

The HVAS PM_{10} data is collected at the Grants Road Quarry site (**Figure 3-1**) before analysis is completed by ALS Environmental. These results are provided to Pacific Environment for presentation in the air quality baseline report.

2.2 Air Quality Criteria

The NSW EPA specifies air quality assessment criteria relevant for assessing impacts from air pollution (**NSW DEC, 2005**). These criteria are health-based (i.e. they are set at levels to reduce the risk of adverse health effects). The EPA criteria are consistent with the National Environment Protection Measures for Ambient Air Quality (referred to as the Ambient Air-NEPM) (**NEPC, 1998**, **NEPC, 2003**).

Table 2-2 summarises the air quality goals for concentrations of particulate matter that are relevant to this study. That is, the criteria stated form the basis for the standards to be achieved at the quarry.

Table 2-2: Air Quality Standards / Goals for Particulate Matter

Pollutant	Averaging Period	Standard / Goal	Agency
Particulate matter with an equivalent aerodynamic diameter less than 10 µm (PM_{10})	24-hour maximum	50 $\mu g/m^3$	EPA impact assessment criteria; NEPM reporting goal (allows five exceedances per year for bushfires)
	Annual mean	30 $\mu g/m^3$	EPA impact assessment criteria

Notes: $\mu g/m^3$ – micrograms per cubic metre, µm – micrometre.

3 MONITORING LOCATION

The Grants Road Sand Quarry baseline monitoring locations are shown in **Figure 3-1**. Featured are the automatic weather station (AWS) and High Volume Air Sampler (HVAS).

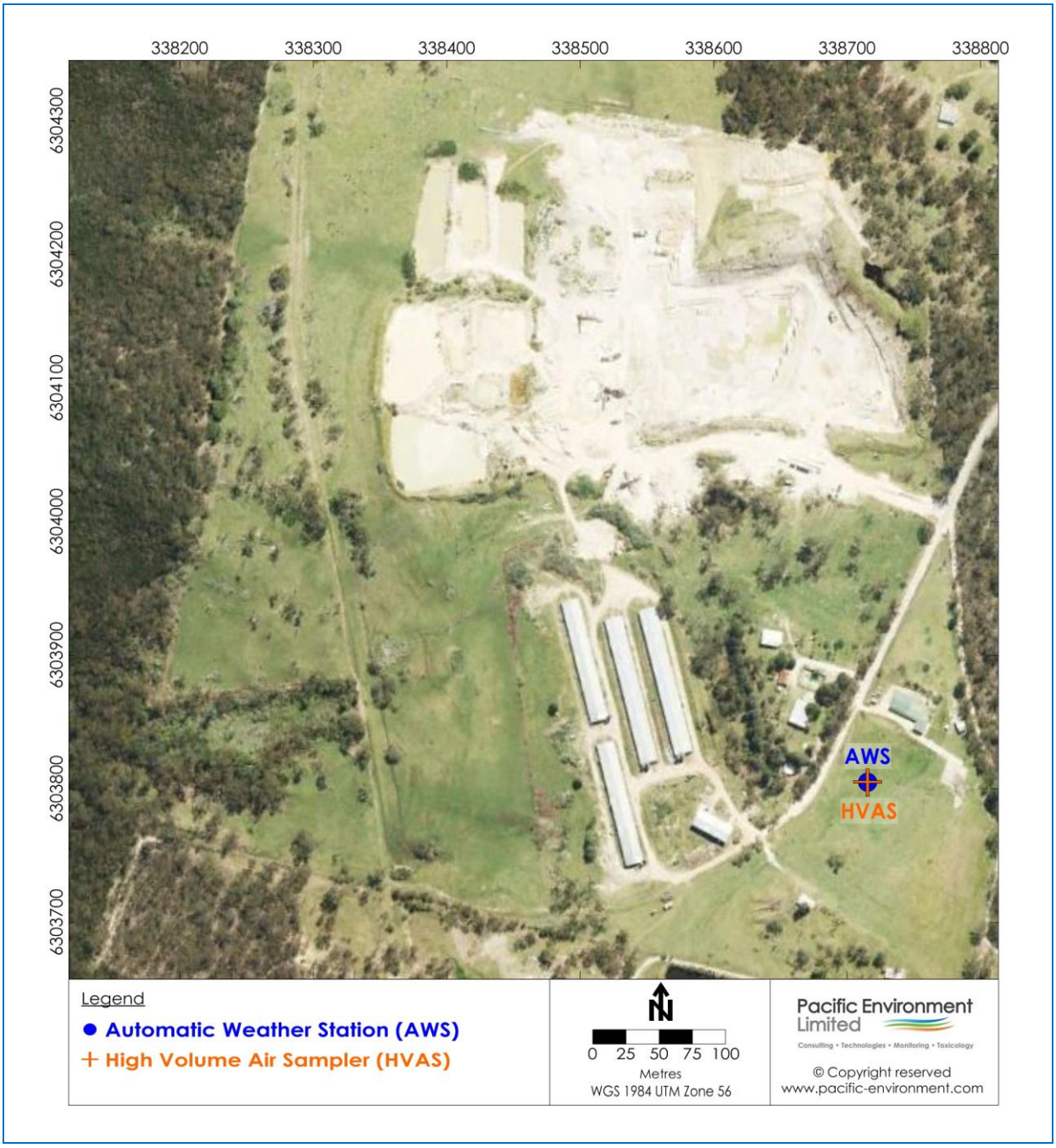

Figure 3-1: Monitoring Locations at Grants Rd Quarry

4 AIR QUALITY MONITORING RESULTS

4.1 Meteorological Monitoring

Meteorological data collected during the 2015 period are summarised in **Table 4-1** and **Table 4-2**.

The weather station was commissioned on 26 June 2015. The valid data recovery rate after all data validation processes was 81% for all parameters excluding 2 m temperature, which stopped recording valid data on 19 November 2015 due to a detachment of the sensor cable and had a resulting valid data recovery rate of 75% (**Table 4-1**). All other sensors went offline on 29 November 2015 due to an issue with the power supply.

At the time of writing, the technical issues were being addressed by Grants Road Quarry. However it is understood that these are still yet to be fully resolved.

Table 4-1: Valid Data Recovery Rates - AWS

Parameter	Valid Data Recovery Rate
Wind Speed	81%
Wind Direction	81%
Temperature – 2 m	75%
Temperature – 10 m	81%
Relative Humidity	81%
Pressure	81%
Solar Radiation	81%

Summary statistics for the data collected to date are shown in **Table 4-2.**

Table 4-2: Summary Statistics

Parameter (units)	Statistical Measure	July 2015	August 2015	September 2015	October 2015	November 2015	December 2015[a]
Wind Speed (m/s)	Mean	2.0	2.0	2.2	2.0	2.0	-
Temperature (°C) – 2m		8.9	12.0	13.5	18.9	11.0[b]	-
Temperature (°C) – 10m		9.1	12.2	13.6	18.9	18.6	-
RH (%)		62.1	64.8	70.6	67.4	71.2	-
Barometric pressure (hPa)		992.5	990.3	992.7	994.8	948.2	-
Wind Speed (m/s)	Median	1.8	1.9	1.9	1.8	1.9	-
Temperature (°C) – 2m		9.2	11.8	12.7	17.9	14.7	-
Temperature (°C) – 10m		9.8	12.1	13.0	18.0	17.9	-
RH (%)		67.3	64.6	72.4	71.7	78.8	-
Barometric pressure (hPa)		993.3	990.1	993.0	994.5	986.5	-
Wind Speed (m/s)	Standard Deviation	1.4	1.0	1.2	1.0	1.2	-
Temperature (°C) – 2m		4.6	4.2	4.0	5.0	9.4	-
Temperature (°C) – 10m		4.4	3.8	3.4	4.6	6.1	-
RH (%)		26.9	16.2	16.8	20.2	23.7	-
Barometric pressure (hPa)		7.9	4.7	5.1	5.4	190.2	-
Rainfall (mm)	Monthly Total	125.0	169.1	182.4	129.6	377.3	-

(a) Data unavailable due to logger power supply issue.
(b) Data unavailable from 19 November 2015 onwards due to detachment of sensor cable.

4.1.1 Wind Data

A wind rose for the annual period 2015 is presented in **Figure 4-1**. The wind rose indicates that from the commissioning of the automatic weather station, monitoring winds from the west are dominant. The average wind speed for the period was 2.1 m/s and the percentage occurrence of calm wind conditions (less than or equal to 0.5 m/s) was 3.9 %.

4.1.2 Temperature

A plot of the hourly average temperature, recorded at 2 m and 10 m, is shown in **Figure 4-2**. July was the coldest month on average with October the hottest month on average. The daily average temperature was 9°C in July, 12°C in August, 14°C in September, 19°C in October and 19°C in November. A maximum daily average of 30°C was recorded on 20 November 2015.

4.1.3 Rainfall

A plot of the daily average rainfall is shown in **Figure 4-3** and the monthly average rainfall is shown in **Figure 4-4**. November recorded the highest monthly rainfall of 377 mm.

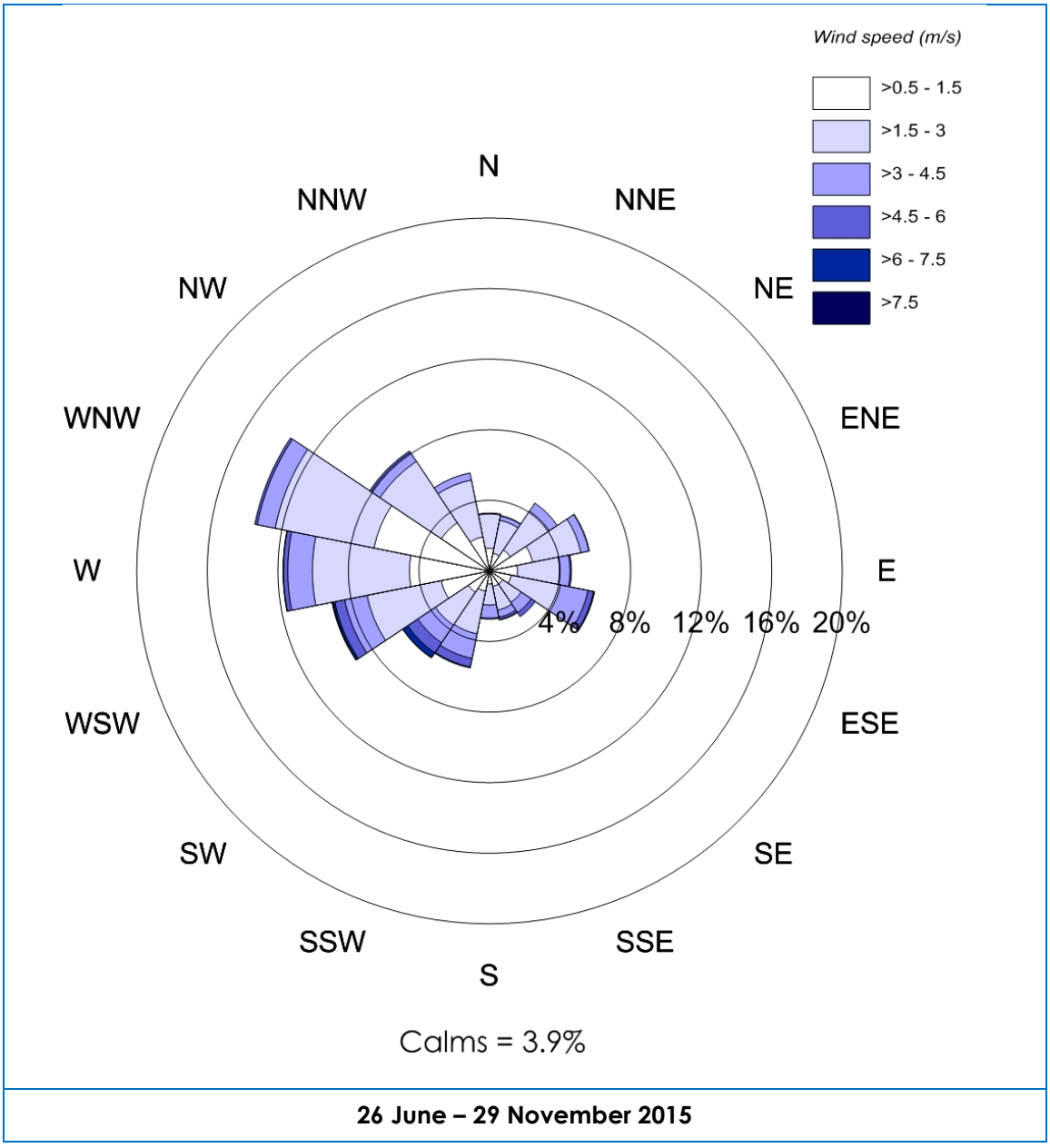

Figure 4-1: Grants Road Sand Quarry Wind Rose, 2015

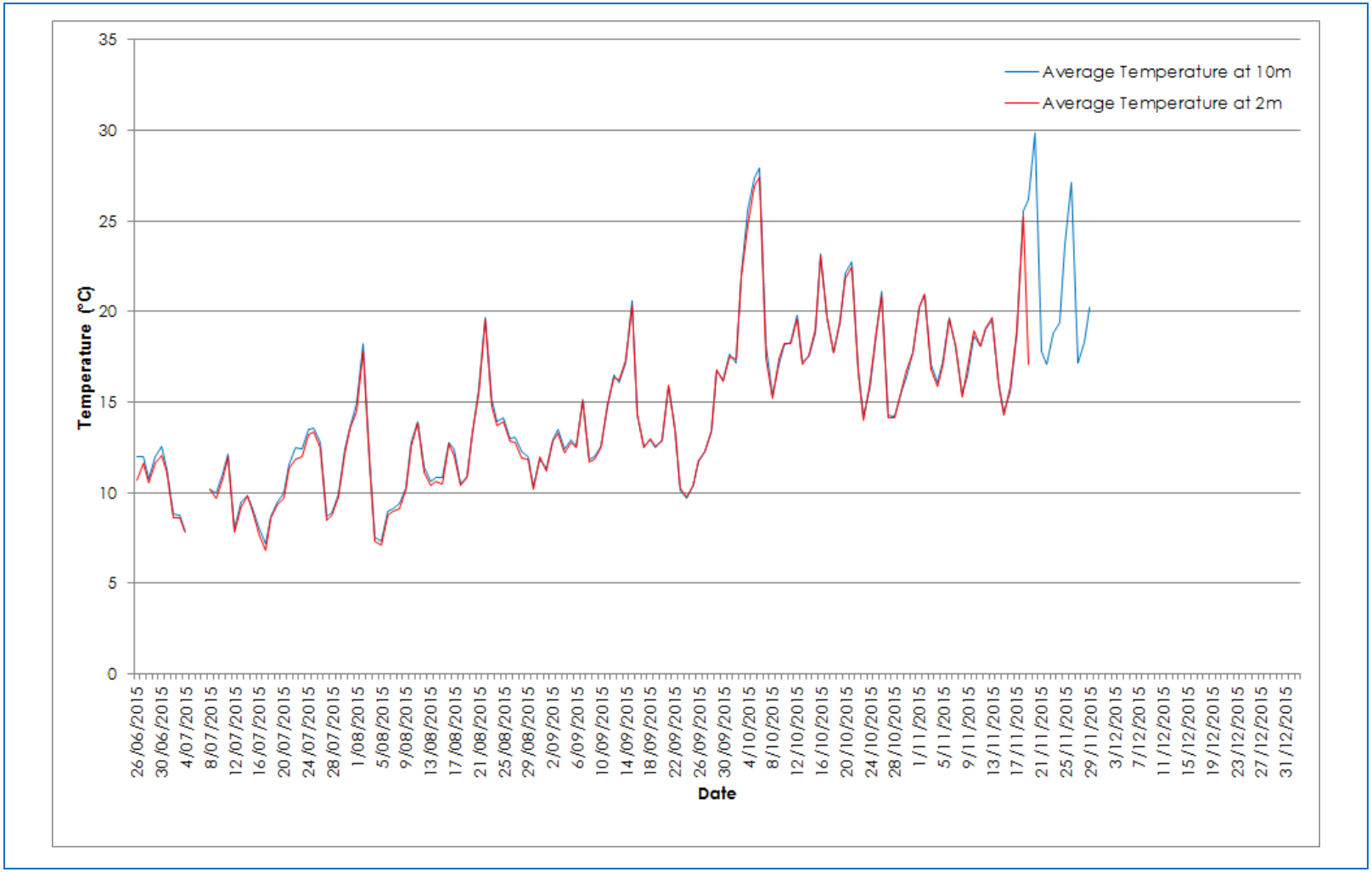

Figure 4-2: Average Daily Temperature, 2015

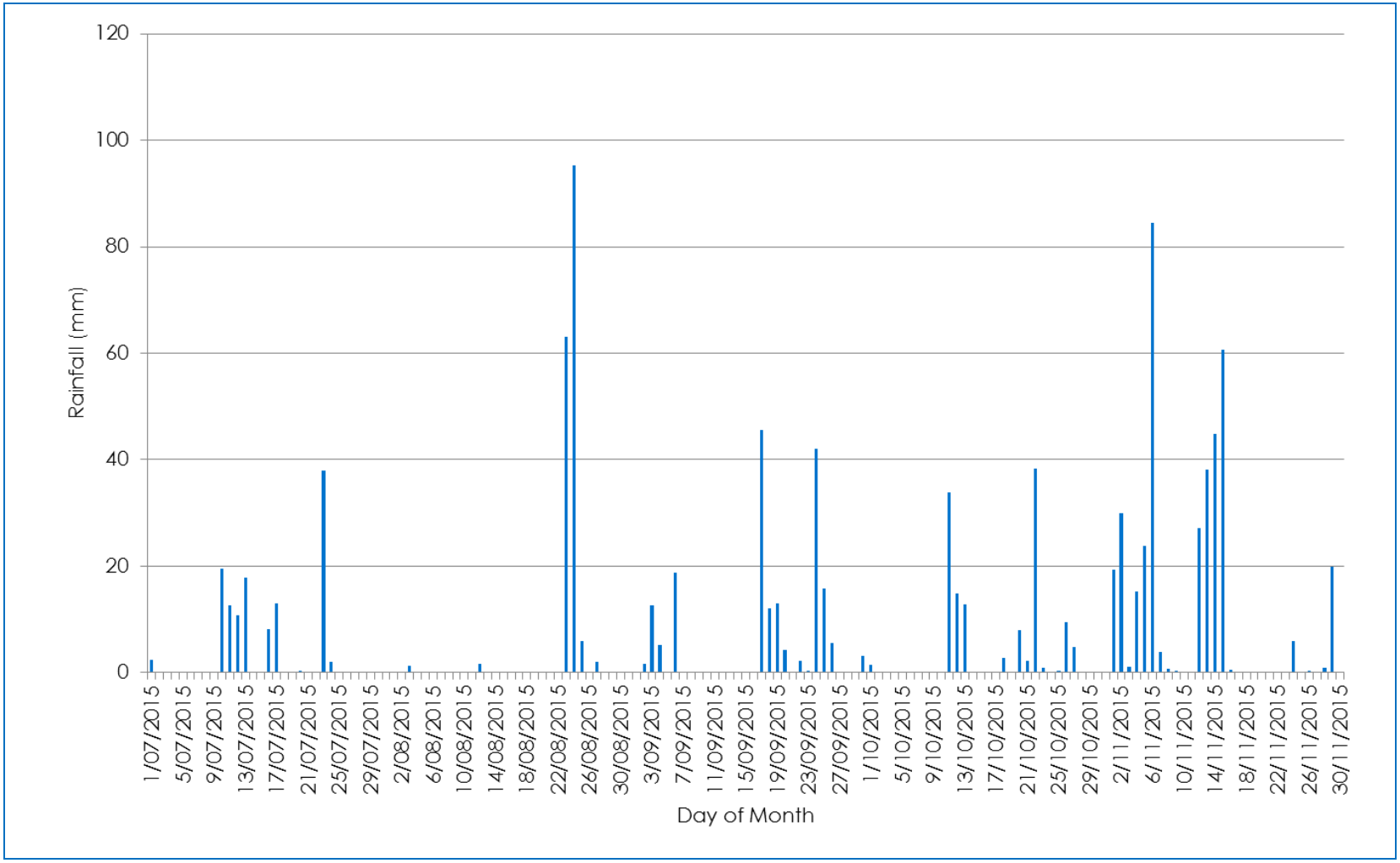

Figure 4-3: Daily Rainfall, 2015

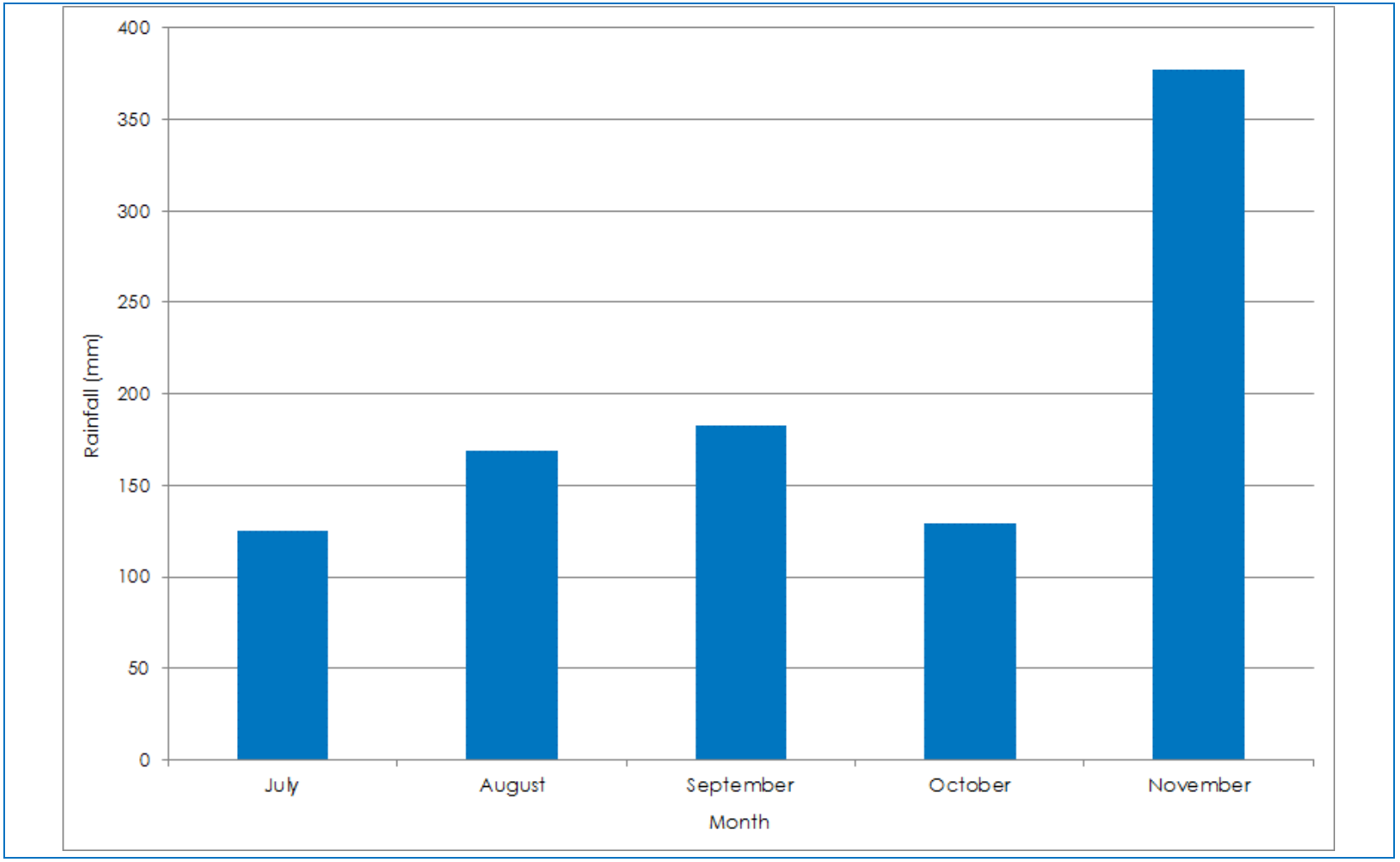

Figure 4-4: Monthly Rainfall Total, 2015

4.2 Particulate Matter (PM_{10})

4.2.1 Measured Results

The results for the available data in 2015/16 are listed in **Table 4-3**. Of a possible thirty five samples (over approximately 6 months), twenty seven samples are reported, resulting in a data recovery rate of approximately 77%. The average PM_{10} concentration over the recorded 6 month period (July to December) was 15.2 µg/m³, compared with the annual EPA impact assessment criterion of 30 µg/m³. All reported results are well within the EPA maximum 24-hour average criterion of 50 µg/m³ for PM_{10}, with a maximum 24-hour average of 31.8 µg/m³ recorded on 10 October 2015. This highest recorded PM_{10} result was likely to be a result of the Hazard Reduction burn carried out by National Parks and Wildlife Service adjacent to the Grants Rd Quarry site.

The dust sample collected by the HVAS monitor includes both dust generated by site activities (incremental dust impact) and dust from all other local sources (background dust levels). However as stated previously, even with the background levels accounted for, the PM_{10} levels are considerably below their respective 24-hour and annual criterion.

Table 4-3: HVAS Monitoring Results for PM_{10}, 2015/16

Date	Measured PM_{10} Concentration (µg/m³)
15/07/2015	9.2
21/07/2015	9.4
27/07/2015	7.3
2/08/2015	11.8
8/08/2015	16.5
14/08/2015	14.9
20/08/2015	31.5
26/08/2015	9.3
1/09/2015	25.9
7/09/2015	12.7
13/09/2015	23.9
19/09/2015	10.4
25/09/2015	4.8
3/10/2015	18.0
10/10/2015	31.8
17/10/2015	23.4
24/10/2015	8.2
31/10/2015	15.2
7/11/2015	14.8
14/11/2015	16.7
21/11/2015	15.9
28/11/2015	16.4
12/12/2015	10.0
19/12/2015	27.8
2/01/2016	5.7
22/01/2016	3.5
3/02/2016	16.5
Approximate 6 Month Average [a]	**15.2 µg/m³**
Maximum value	**31.8 µg/m³**

(a) Average for 7 month period, July 2015 to February 2016.

4.2.1 Comparison to Environmental Assessment Predictions

The Air Quality Assessment (AQA) for the Grants Road Sand Quarry Extension was completed by PAEHolmes in 2013, *Air Quality Impact Assessment – Extension of Grants Road Quarry* (**PAEHolmes, 2013**). The cumulative results predicted in the assessment indicate that the 24-hour PM_{10} ground level concentrations at the current location of the HVAS would be in the order of 70 µg/m^3. The highest measured cumulative 24-hour PM_{10} concentration was 31.8 µg/m^3, a value considerably lower than the conservative predictions made in the air quality assessment. However, these measurements have only been conducted over an approximate six month period to date.

The predicted annual PM_{10} concentration in the AQA was approximately 30 µg/m^3 at the HVAS location, however a concentration (period between July 2015 and February 2016) of 15.2°µg/m^3 was measured. This is consistent with the 24-hour results, where the actual concentration has been established to constitute about 50% of the predicted concentration at the same location.

Given the results of the 2015 data, currently no action is required to control environmental performance. Rather it is recommended that current mitigation processes are sustained.

5 REFERENCES

Australian Standard / New Zealand Standard (2015). Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - PM_{10} high volume sampler with size-selective inlet - Gravimetric method. AS 3580.9.6:2015.

Australian Standard / New Zealand Standard (2007). Methods for sampling and analysis of ambient air - Guide to siting air monitoring equipment. AS 3580.1.1:2007

NEPC (1998, 2003). "National Environment Protection (Ambient Air Quality) Measure"

NSW DEC (2005). Approved Methods for the Sampling and Analysis of Air Pollutants in NSW. New South Wales EPA 59-61 Goulburn Street, Sydney, NSW August 2005.

NSW EPA (2005). "Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales". NSW Department of Environment & Conservation. Sydney.

PAEHolmes (2013). "Air Quality Impact Assessment – Extension of Grants Road Quarry".

Appendix 5

GROUNDWATER DEPENDENT ECOSYSTEM

Conacher Consulting

GROUNDWATER DEPENDANT ECOSYSTEM MONITORING AND MANAGEMENT PROGRAM

GRANTS ROAD SAND QUARRY EXTENSION

LOT 1 DP 358717

270 GRANTS ROAD
SOMERSBY

FEBRUARY 2016
REF: 4141

PREFACE

This report has been prepared prepared by *Conacher Consulting* to address the 2015 annual reporting requirements for Groundwater Dependant Ecosystems for the approved extension to the Grants Road Sand Quarry at Somersby.

REPORT PREPARED BY:

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TABLE OF CONTENTS

1. INTRODUCTION

1.1 Document Intent

This report has been prepared by *Conacher Consulting* to address Condition 21 "Groundwater Dependant Ecosystem Monitoring and Management Program" of the Schedule 3 Environmental Performance Conditions specified within the Project Approval issued under Section 75J of the Environmental Planning and Assessment Act (1979) for the Grants Road Sand Quarry Extension project.

This report provides additional information as required under the Project Approval and proposes minor modifications to the monitoring and management documentation previously submitted.

This report provides some preliminary details on the extent and current condition of the GDE vegetation present. Detailed monitoring of GDE vegetation is required to commence at the end of the current calendar year and has not been undertaken for 2015 as quarry operations under the approval had not commenced.

1.2 Project Site Details

The project site is located within Lot 1 DP 358717, 270 Grants Road Somersby. The project area is mapped in Figure 1.1.

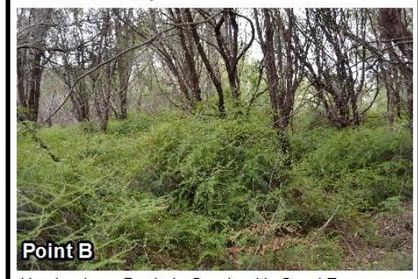
1.3 Groundwater Dependant Ecosystems Details

The following groundwater dependant ecosystems (GDEs) have been mapped within one kilometre of the project area by Bell (2009):

- Sandstone Hanging Swamps and Heaths
- Hawkesbury Coastal Banksia Woodland

These GDEs are recognised as high priority groundwater dependant ecosystems in Schedule 5 of the Water Sharing Plan for the Kulnura Mangrove Mountain Groundwater Sources (2003). The mapped extent of these GDEs within one kilometre of the project area is shown in Figure 1.1.

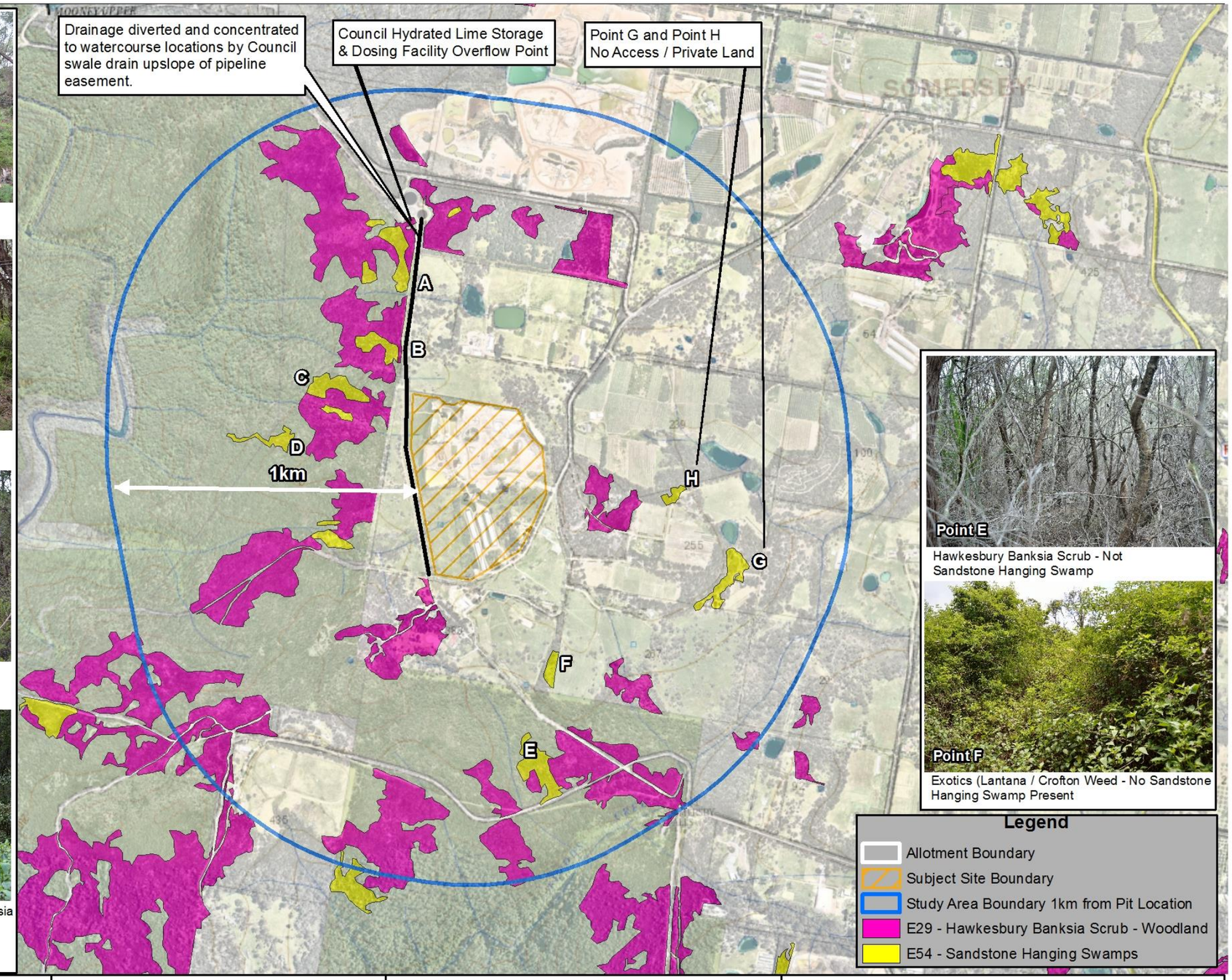
Hawkesbury Banksia Scrub with Coral Fern Understorey



Hawkesbury Banksia Scrub with Coral Fern Understorey

Hawkesbury Banksia Scrub - Not Sandstone Hanging Swamp

Crofton Weed with Coral Fern/Tree Fern & Banksia Scrub around edges / Not Sandstone Hanging Swamp



Hawkesbury Banksia Scrub - Not Sandstone Hanging Swamp

Exotics (Lantana / Crofton Weed - No Sandstone Hanging Swamp Present

conacher consulting

N

0 100 200 300 400 500 m

Drawn By: JM
Drawing Version: 1
Drawing No: 4141
Date:14/07/14

* Plan for indicative purposes only. Not for detailed measurement.
Source: Aerial © Nearmap (2016)

Figure 1.1
Groundwater Dependant Ecosystems Field Investigation Results
Grants Road, Somersby

2. PROJECT DETAILS

2.1 Project Commencement Details

Extraction works under the extension approval commenced on 4 January 2016, as such the first detailed monitoring report on groundwater dependant ecosystems is to be provided as part of the 2016 annual reporting documentation.

2.2 Project Approval Requirements for GDE Monitoring and Management

Parts of the environmental performance conditions 19 and 21 of the Project Approval are relevant to the monitoring and management of GDEs. The relevant sections of these conditions have been extracted from the project approval and are provided below in Figures 2.1 and 2.2. The relevant parts of these conditions have been addressed within this report.

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.

Figure 2.1. Extract of part of Environmental Performance Condition 19 of relevance to GDEs.

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.

Figure 2.2. Extract of part of Environmental Performance Condition 21 of relevance to GDEs.

2.3 Consultations

Consultation with the NSW Office of Water has been undertaken in accordance with Environmental Performance Condition 21.

A copy of the consultation documentation is provided in Attachments 1 and 2.

3. DESCRIPTION OF THE NATURE AND EXTENT OF GROUNDWATER RELIANCE FOR EACH GROUNDWATER DEPENDANT ECOSYSTEM

3.1 Nature of Groundwater Reliance for Groundwater Dependant Ecosystems

The following vegetation types mapped within one kilometre of the site by Bell (2009), have been identified in the Water Sharing Plan for the Kulnura Mangrove Mountain Groundwater Source (Dept. of Infrastructure, Planning and Natural Resources 2006) as high priority groundwater dependant ecosystems:

- Hawkesbury Coastal Banksia Woodland
- Sandstone Hanging Swamp

Hawkesbury Coastal Banksia Woodland
Hawkesbury Banksia Scrub-Woodland is a structurally variable community which consists of either tall dense scrub dominated by *Banksia ericifolia* or an open scrub or low heath with scattered emergent eucalypts.

Consultation with the NSW Office of Water has determined that the classification of this community as a high priority GDE was based on a desktop assessment, conservation ranking by a local National Parks officer and historical observations of vegetation stress during variable climatic conditions by a local long term farmer.

Sandstone Hanging Swamps
Sandstone Hanging Swamps are widely recognised as a groundwater dependant ecosystems in the scientific literature. The Sandstone Hanging Swamp vegetation type mapped by Bell (2009) is recognised by the NSW Scientific Committee (2012) as the endangered ecological community Coastal Upland Swamp in the Sydney Basin Bioregion. It is described by The NSW Scientific Committee (2012) as a typically treeless community which occurs on periodically waterlogged soils on impermeable Hawkesbury sandstone plateaus in the headwater valleys of streams and on sandstone benches with abundant seepage moisture.

3.2 Extent of Groundwater Reliance for Groundwater Dependant Ecosystems

Field inspections of the areas of mapped Sandstone Hanging Swamp Vegetation were undertaken prior to recent hazard reduction burns on 9 December 2014, the following details are provided.

Hawkesbury Coastal Banksia Woodland
Field observations have identified that within the study area this community generally consists of a tall heath of Banksia *ericifolia* with varying levels of soil moisture within the ground layer.

The reliance of groundwater regimes is considered to be directly related to run-on from altered drainage points as shown in Figure 1.1. Runoff diversion and concentration has occurred due to the installation of a cross contour public pipeline with an open swale drain, runoff from dams and basins and discharge from Council's water supply and Hydrated Lime Storage and Dosing facility to the north.

Where increased soil moisture was present associations with upslope man-made drainage points were typically present and the understorey contained an opportunistic growth of coral fern in the understorey.

The dryer variant of this community did not contain obligate GDE flora species and was located on sandstone soils which appeared to be shallow and well drained. It is considered that these areas are likely to have a low reliance on groundwater regimes.

Sandstone Hanging Swamps
Bell (2007) has identified that available vegetation mapping for the area has not been thoroughly ground-truthed within the National Park areas and it is possible that areas of Sandstone Hanging Swamps actually consist of Hawkesbury Coastal Banksia Woodland vegetation as both display similar photo patterns on aerial photographs relative to post-fire age of *Banksia ericifolia* thickets.

Where access was available field verification of the Bell (2009) vegetation mapping was undertaken to determine the extent of GDE vegetation present. The surveys identified that the areas mapped as Sandstone Hanging Swamp vegetation by Bell (2009) contained either dense weed infestations of weeds or Hawkesbury Coastal Banksia Woodland vegetation. No true sandstone hanging swamps were observed within the study area. The results of the field inspections are provided in Figure 1.1.

Mapping Limitations
A NPWS back-burning operation was undertaken adjacent to the site between 8 and 10 October 2015 within the adjoining Brisbane Water National Park. In areas adjacent to the site the burn was undertaken mostly in areas close to walking tracks and cleared edges with some burning occurring within the rehabilitation area onsite. The NPWS correspondence regarding the hazard reduction burn operation is provided as Attachment 3.

It is recommended that further baseline surveys of the extent and condition of the subject vegetation be undertaken approximately 12 months from the date of the hazard reduction burn operations to allow a proper assessment of the vegetation. This will also coincide with the requirement for annual monitoring under the Groundwater Dependant Ecosystem management plan.

4. PROPOSED REVISED METHODOLOGY FOR THE LONG TERM MONITORING OF THE CONDITION OF GROUNDWATER DEPENDANT ECOSYSTEMS

Quarry operations commenced within the on 4 January 2016 and as such the first detailed monitoring report is to be provided as part of the 2016 annual reporting documentation. The following refinements to the monitoring methodology initially submitted are proposed as documented below.

4.1 Monitoring Program Sampling Design

Permanent monitoring quadrats are to be established at each of the locations shown in Figure 4.1. The monitoring is to be undertaken on an annual basis as approved.

4.2 Sampling Methods

Groundwater dependant ecosystem condition will be monitored through sampling of both qualitative and quantitative variables. The variables to be measures and the sampling techniques to be employed are outlined as follows.

4.2.1 Quantitative Sampling Methods

i. *Native Plant Cover and Floristics*
The total cover of native flora species for each vegetation stratum (upper, mid and lower) is to be recorded for each plot annually.

The dominant native flora species in each vegetation stratum are to be recorded.

i. *Exotic Plant Cover and Floristics*
The total cover of exotic flora species for each vegetation stratum (upper, mid and lower) is to be recorded for each plot annually.

The dominant exotic flora species in each vegetation stratum are also to be recorded for each plot annually.

iv. *GDE Extent*
Mapping of GDE extent is to be undertaken during late 2016 following regrowth from the recent NPWS hazard reduction burn operations. The extent of the GDE is to be mapped by aerial photograph interpretation supplemented by field checks every five years. This will facilitate the detection of long-term change to the extent of the vegetation present.

4.2.2 Qualitative Sampling Methods

i. Vegetation Photo Point Monitoring
Photographs are to be taken for each monitoring quadrat from each cardinal point from the centre point of each monitoring plot. The photographs are to be taken annually to allow consistent visual comparison of the vegetation present.

ii. Surface Erosion and Sedimentation Monitoring
A visual monitoring inspection of GDE vegetation downslope of the site is to be undertaken annually and also when erosion and sediment controls have been breached. Monitoring is to include photographing, mapping and reporting for the areas GDE vegetation affected.

iv. Comparison of Groundwater Monitoring Data
Groundwater monitoring is to be undertaken for the project and reviewed and included within reporting where mapping identifies a reduction in the extent of GDE vegetation.

5. PERFORMANCE INDICATORS AND TRIGGER LEVELS FOR PROJECT-RELATED ENVIRONMENTAL CONSEQUENCES ON GROUNDWATER DEPENDANT ECOSYSTEMS

The following performance indicator for project-related environmental consequences on groundwater dependant ecosystems and trigger levels to initiate mitigation / response measures are provided. Monitoring of performance indicators is to be undertaken annually.

Quarry operations commenced within the on 4 January 2016 and as such the first detailed monitoring report is to be provided as part of the 2016 annual reporting documentation.

5.1 Groundwater Dependant Ecosystem Surface Erosion

i. Performance Indicator
Negligible erosion of the surface within the GDEs as a result of adverse impact attributable to the quarry operations authorised under the project approval.

ii. Trigger Level
Observable erosion of the surface within the GDEs, directly attributable to the quarry operations authorised under the project approval.

5.2 Groundwater Dependant Ecosystem Sedimentation

i. Performance Indicator
Negligible sedimentation within the GDEs as a result of adverse impact attributable to the quarry operations authorised under the project approval.

ii. Trigger Level
Observable sedimentation within the GDEs, directly attributable to the quarry operations authorised under the project approval.

5.3 Groundwater Dependant Ecosystem Size

i. Performance Indicator
Only minor changes in the sizes of the GDEs as a result of adverse impact attributable to the quarry operations authorised under the project approval.

ii. Trigger Level
Adverse change in size of the GDEs of greater than 20% mappable extent, directly attributable to the quarry operations authorised under the project approval.

5.4 Groundwater Dependant Ecosystem Species Composition and Distribution

i. Performance Indicator
No significant change to the composition or distribution of species within the GDEs as a result of adverse impact attributable to the quarry operations authorised under the project approval.

ii. Trigger Level
Adverse change in composition or distribution of the dominant species, directly attributable to the quarry operations authorised under the project approval.

6. CONTINGENCY PLAN MEASURES TO ENSURE MINOR ENVIRONMENTAL CONSEQUENCES ON GROUNDWATER DEPENDANT ECOSYSTEMS

6.1 Mitigation and Response Measures

If monitoring identifies that the project has adversely exceeded the performance indicators outlined in Section 5 of this plan, the Proponent is to implement appropriate remediation measures to rehabilitate the affected areas of groundwater dependant ecosystem vegetation.

The Proponent shall provide a suitable offset to compensate for the impact or environmental consequence, to the satisfaction of the Secretary where the project exceeds the performance indicators outlined in Section 5 of this plan and the Secretary determines that:

a) It is not reasonable of 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;

Any offset required must be proportionate with the significance of the impact or environmental consequence to groundwater dependant ecosystems.

Monitoring is to be undertaken annually. Quarry operations commenced within the on 4 January 2016 and as such the first detailed monitoring report is to be provided as part of the 2016 annual reporting documentation.

6.2 Management and Reporting Protocol

Annual reporting of the monitoring results is to be undertaken after the completion of each calander year for inclusion within each Annual Review. Management recommendations are to be provided and implemented in accordance with annual monitoring results.

Monitoring is to be undertaken annually. Quarry operations commenced within the on 4 January 2016 and as such the first detailed monitoring report is to be provided as part of the 2016 annual reporting documentation.

6.3 Management Plan Review Protocol

This management plan is to be reviewed in conjunction with the Environmental Management Strategy prepared for the site.

7. REFERENCES

Bell (2007) *Review of Flora and Fauna Information for Grants Road Sands*, Gosford LGA.

Bell, S.A.J. 2009. *The natural vegetation of the Gosford Local Government Area, Central Coast, New South Wales: Revised and Updated.* Report to Gosford City Council. Eastcoast Flora Survey.

NSW Scientific Committee 2012, Coastal Upland Swamp in the Sydney Basin Bioregion – endangered ecological community listing, NSW Scientific Committee Final Determination. Available Online: http://www.environment.nsw.gov.au/determinations/coastaluplandswampfd.htm

Water Sharing Plan for the Kulnura Mangrove Mountain Groundwater Sources 2003. New South Wales Government.

ATTACHMENT 1
COPY OF CONSULTATION LETTER FORWARDED TO NSW DPI OFFICE OF WATER

Our Ref: 4140

27 October 2014

Ms Stephanie Lynch
Senior Water Regulation Officer
NSW DPI Office of Water
PO Box 2213
DANGAR NSW 2309

RE: DEPARTMENT CONSULTATION
GRANTS ROAD SAND QUARRY EXTENSION PROJECT (PROJECT REF. 08_0099)

Dear Madam,

I am contacting you regarding the approved Grants Road Sand Quarry Extension project located at 270 Grants Road Somersby (Application No. 08_0099).

You were listed as the NSW Office of Water contact person during the assessment phase of this project.

Conacher Consulting have been engaged on behalf of the proponent, GR and AK Jones, to prepare the Groundwater Dependant Ecosystem Monitoring and Management Program (GDEMMP) required under the Environmental Performance Conditions of the Project Approval.

In accordance with the requirements of the Project Approval we are consulting with the NOW on behalf of the proponent, with regard to the preparation of the GDEMMP. Could you please advise whether the NOW would like to discuss any relevant background documentation, guidelines, methodologies or other materials which may assist in the preparation of the abovementioned documentation for this project.

Yours faithfully,

P A Conacher
Project Director
CONACHER CONSULTING

ATTACHMENT 2
COPY OF EMAIL CONSULTATIONS WITH NSW OFFICE OF WATER

From: Christie Jackson [mailto:christie.jackson@dpi.nsw.gov.au]
Sent: Monday, 3 November 2014 11:56 AM
To: conacherconsulting@gmail.com
Cc: John P Williams
Subject: Grants Road Sand Quarry - Groundwater Dependent Ecosystem Monitoring and Management Program

P A Conacher,

I refer to your letter dated the 27 October 2014 in relation to the preparation of a Groundwater Dependent Ecosystem Monitoring and Management Program (GDEMMP) for Grants Road Sand Quarry. Whilst the Office of Water has no specific documentation to refer you to, our Hydrogeologist John Williams located in the Gosford office is happy to meet with you to discuss the preparation of the GDEMMP if required. John's contact details are (02) 4348 5007 or john.p.williams@dpi.nsw.gov.au

Kind regards

Christie Jackson, Water Regulation Officer
Water Regulation North North Coast
Office of Water
Level 3 Noel Park House | 155-157 Marius Street | PO Box 550 | Tamworth NSW 2340
T: 02 6701 9652 | **F:** 02 6701 9682
E: christie.jackson@dpi.nsw.gov.au
W: www.water.nsw.gov.au

Part Time: Monday-Thursday

--

John Williams
Natural Resource Project Officer (Groundwater Management)
NSW Office of Water
ph:(02) 4348 5007
email john.p.williams@dpi.nsw.gov.au
PO Box 340
Gosford NSW 2250

This message is intended for the addressee named and may contain confidential information. If you are not the intended recipient, please delete it and notify the sender. Views expressed in this message are those of the individual sender, and are not necessarily the views of their organisation.

On 27 November 2014 at 16:36, Jacob Manners <conacherconsulting@gmail.com> wrote:

Hi John,

Christie Jackson has referred us to you as part of our consultations with NOW regarding the preparation of the Groundwater Dependant Ecosystem Monitoring and Management Program (GDEMMP) we are preparing for the Grants Road Sand Quarry.

To better inform the GDEMMP can you please provide some background information on how the high priority GDEs listed in Schedule 5 of the Water Sharing Plan for the Kulnura Mangrove Mountain Groundwater Sources were determined.

I am particularly interested in understanding how the Hawkesbury Coastal Banksia Woodland vegetation type was determined to be a high priority GDE.

Regards,

Jacob Manners
Senior Project Manager / Ecologist

conacher consulting

Phone (02) 4324 7888
Postal Address PO Box 4082 East Gosford NSW 2250

Hi Jacob

The identification, quantifying dependence and mapping the distribution and vulnerability of GDEs to change was a relatively new field for the NSW government with limited literature on how to undertake such a study. The Nature Conservation Council of NSW (1999) – 'Desktop Methodology to Identify GDEs' provides a guideline and was specifically developed to assist government and groundwater managers in making decisions about groundwater management at a regional level. This guideline was used as a template to assess GDEs within the boundaries of the KMMA system, and where possible additional studies undertaken.

Essentially it involved a three stage process comprising:

- Stage 1 - the compilation of known GDEs.
- Stage 2 – filters non-GDEs and provide triggers for potential undefined ecosystems.
- Stage 3 – based on the uniqueness and vulnerability, prioritise the identified ecosystems.

Vulnerability to the groundwater system due to surrounding land use is scored from 1 (low) to 5 (high). The degree of vulnerability is relative to cumulative groundwater extraction, point and diffuse source pollution, industry, mining and agricultural activities and landfills, stormwater and septic systems from urban environments. Similarly, uniqueness of an ecosystem based on the ecological significance for biodiversity conservation is scored as 1 (common), 2 (local), 3 (regional), 4 (state) and 5 (national). NOW provided licenced allocation and bore distribution to identify those vegetation communities in proximity to licenced extraction.

In spring 2000, the Lower Hunter Central Coast Regional Environmental Management Strategy (LHCCREMS) mapping was released. LHCCREMS provided complete coverage at a resolution of 1:25000. Twenty four 24 vegetation communities occur within the boundaries of the KMMA. Vegetation communities were defined based on both vegetation species present within the communities and the structure of the communities. Our local local National Parks Officer assisted with ranking conservation value for the different vegetation communities for the LHCCREMS, a local long term farmer provided his knowledge of historical observations on vegetation stress during variable climatic conditions.

Of general note, investigations by the Water Authority of WA within the banksia woodlands of Western Australia, found that the trees that are most susceptible to changes in water levels are the species that grow in areas where depth to water table is less than 6 metres from the surface.

John

ATTACHMENT 3
CONSULTATION DETAILS OF NPWS 2015 HAZARD REDUCTION BURN OF ADJOINING LAND

From: Liz Phelps [mailto:Liz.Phelps@environment.nsw.gov.au]
Sent: Wednesday, 18 November 2015 4:41 PM
To: info@grantsrdsand.com.au
Subject: Belmont North Hazard Reduction burn

Attention: Leanne Jones
Grants Road Sand Quarry

The National Parks and Wildlife Service wishes to confirm that we conducted the Belmont North hazard reduction burn on the 8-10 October 2015. The burn covered 288 hectares and was bounded by Reservoir Road in the north, Mooney Mooney creek in the west, Somersby Falls Rd in the south and properties to the west of Grants Rd in the east. The burn area was approximately 100 metres from the Grants Road Sand Quarry. The burn area contained very high to extreme fuel loads and burnt very well on these 3 days, emitting large smoke plumes. The burn was extinguished by rainfall on Sunday 11 October.

Any further enquiries in relation to this matter may be directed to me via the contact details below.

Regards

Liz Phelps
Ranger Bouddi NP East and Wambina NR
National Parks and Wildlife Service - NSW Office of Environment and Heritage
Ph: 4320 4223 Fax: 4320 4299 Mobile: 0407 282736

Appendix 6
SOMERSBY MINTBUSH
Conacher Consulting

SOMERSBY MINTBUSH
2015 MONITORING REPORT

GRANTS ROAD SAND QUARRY EXTENSION

LOT 1 DP 358717

270 GRANTS ROAD
SOMERSBY

FEBRUARY 2016
REF: 4142

PREFACE

This report has been prepared prepared by *Conacher Consulting* to address the 2015 annual reporting requirements for Somersby Mintbush for the approved extension to the Grants Road Sand Quarry at Somersby.

REPORT PREPARED BY:

PHILLIP ANTHONY CONACHER B.Sc.(Hons), Dip.Urb Reg Planning, M.Nat.Res.
NPWS Scientific Licence Number: SL100361
Project Director

JACOB MANNERS B.Sc.
NPWS Scientific Licence Number: SL100361
Senior Ecological Consultant / Project Manager

1. INTRODUCTION

1.1 Document Intent

This report has been prepared prepared by *Conacher Consulting* to address the monitoring requirements of Condition 22 "Somersby Mintbush Monitoring and Management Program" of the Schedule 3 Environmental Performance Conditions specified within the Project Approval issued under Section 75J of the Environmental Planning and Assessment Act (1979) for the Grants Road Sand Quarry Extension project.

1.2 Project Site Details

The project site is located within Lot 1 DP 358717, 270 Grants Road Somersby.

2. MONITORING RESULTS

2.1 Baseline Assessment Results

A baseline assessment of the *Prostanthera junonis* locations previously identified adjacent to the site and described as Population 7 Reservoir Road Brisbane Water National Park was undertaken on 23 October 2015 and 7 November 2015.

No specimens of *Prostanthera junonis* were observed during the surveys as the locations where this species was previously identified had been subject to a targeted hazard reduction burn.

Contact with the National Parks and Wildlife Service confirmed that a hazard reduction burn was undertaken on 8-11 October with very high to extreme fuel loads which burnt very well over the three days emitting large smoke plumes. NPWS identified that the fire was limited to within 100m of the subject site, however field surveys identified that the burn was directly adjacent to the site and in some places burnt vegetation within the offset area on the site. Review of the Somersby Mintbush Recovery Plan has identified that the time of the previous fire in this location was 1994.

The previous location of *P. junonis* identified along the Great North Walk track showed noticeable signs of erosion caused by inadequate track maintenance and poor design.

Details of the consultations with NPWS regarding the burn are provided in Attachment 1. Photographs of the identified *P. junonis* habitat locations taken following the back burn operations during 2015 are provided in Attachment 2.

2.2 Review and Comparison of Monitoring Results with Performance Indicators

The following performance indicators have been developed with regard to *P. junonis.*

- *Prevention of any erosion of the surface of areas containing Somersby Mintbush as a result of actions associated with the approved extraction operations*
- *Prevention of sedimentation within areas containing Somersby Mintbush as a result of actions associated with the approved extraction operations*
- Prevention of reduction in the area of the sites containing Somersby Mintbush *as a result of actions associated with the approved extraction operations.*

No visible signs of disturbance to *P. junonis* or its habitats as a result of quarry activities were observed.

2.3 Details of Non-compliance Matters

No non-compliance matters were observed with regard to Somersby Mintbush.

2.4 Monitoring Trends

No trends were observed as the Somersby Mintbush present was burnt out by a planned NPWS Hazard Reduction Burn.

2.5 Project Impact Discrepancies

No discrepancies between the predicted and actual impacts of the project were observed with regard to Somersby Mintbush.

It is considered that the recent back burning operations of the NPWS have had more than negligible environmental consequences to the habitats of this species and these impacts may persist for several years while the habitats regenerate. This impact should not be attributed the the extraction operations within the site.

2.6 Measures to Improve Project Performance

No necessary measures to improve project performance were identified for the current monitoring period.

3. CONCLUDING COMMENTS

The following concluding comments are provided:

i. Further counts of the previously identified locations of *P. junonis* should be undertaken during the 2016 monitoring period.

ii. Suitable erosion and sedimentation controls should continue to be maintained for the site.

iii. The recent back burning operations of the NPWS have impacted the habitats of Somersby Mintbush within the Brisbane Water National Park and these impacts should not be attributed the the extraction operations within the site.

ATTACHMENT 1
CONSULTATION DETAILS OF NPWS 2015 BACKBURN OF ADJOINING LAND

From: Liz Phelps [mailto:Liz.Phelps@environment.nsw.gov.au]
Sent: Wednesday, 18 November 2015 4:41 PM
To: info@grantsrdsand.com.au
Subject: Belmont North Hazard Reduction burn

Attention: Leanne Jones
Grants Road Sand Quarry

The National Parks and Wildlife Service wishes to confirm that we conducted the Belmont North hazard reduction burn on the 8-10 October 2015. The burn covered 288 hectares and was bounded by Reservoir Road in the north, Mooney Mooney creek in the west, Somersby Falls Rd in the south and properties to the west of Grants Rd in the east. The burn area was approximately 100 metres from the Grants Road Sand Quarry. The burn area contained very high to extreme fuel loads and burnt very well on these 3 days, emitting large smoke plumes. The burn was extinguished by rainfall on Sunday 11 October.

Any further enquiries in relation to this matter may be directed to me via the contact details below.

Regards

Liz Phelps
Ranger Bouddi NP East and Wambina NR
National Parks and Wildlife Service - NSW Office of Environment and Heritage
Ph: 4320 4223 Fax: 4320 4299 Mobile: 0407 282736

ATTACHMENT 2
SOMERSBY MINTBUSH HABITAT PHOTOS FOLLOWING HAZARD REDUCTION BURN

Photo 1. Monitoring Stake at burnt *P. junonis* location.

Photo 2. Burnt *P. junonis* habitat along Great North Walk.

Photo 3. Burnt *P. junonis* habitat along Great North Walk. Note diversion of original track on right and track diversion / rut erosion through habitat location.

Photo 4. Burnt *P. junonis* habitat location / note previous monitoring stake.

Photo 5. Burnt habitat adjacent to the quarry boundary.

Appendix 7

LANDSCAPE AND REHABILITATION MONITORING

Conacher Consulting

LANDSCAPE & REHABILITATION
2015 MONITORING REPORT

GRANTS ROAD SAND QUARRY EXTENSION

LOT 1 DP 358717

270 GRANTS ROAD
SOMERSBY

MARCH 2016
REF: 4143

PREFACE

This report has been prepared prepared by *Conacher Consulting* to address the 2015 annual reporting requirements for the Landscape and Rehabilitation works for the approved extension to the Grants Road Sand Quarry at Somersby.

REPORT PREPARED BY:

PHILLIP ANTHONY CONACHER B.Sc.(Hons), Dip.Urb Reg Planning, M.Nat.Res.
NPWS Scientific Licence Number: SL100361
Project Director

JACOB MANNERS B.Sc.
NPWS Scientific Licence Number: SL100361
Senior Ecological Consultant / Project Manager

1. INTRODUCTION

1.1 Document Intent

This report has been prepared by *Conacher Consulting* to address the 2015 annual reporting requirements for the project.

An additional detailed baseline monitoring report is to be prepared by *Conacher Consulting* to address the monitoring requirements outlined in the Landscape and Rehabilitation Plan prepared for the project and submitted with the 2016 annual reporting documentation.

1.2 Project Site Details

The project site is located within Lot 1 DP 358717, 270 Grants Road Somersby.

2. MONITORING RESULTS

2.1 Baseline Assessment

The Landscape and Rehabilitation Plan for the project was approved on 11 December 2015. A Baseline Monitoring Report is to be prepared following the first 12 months from the implementation of the Landscape and Rehabilitation Plan and submitted with the 2016 annual reporting.

2.2 Details of Management Works Undertaken

A total of 36 nest boxes were installed at the project site on 23 October 2015 in accordance with condition 23 of the project approval. Other first year works required are to be undertaken during 2016, in accordance with the Landscape Rehabilitation Management Plan, and reported in the Baseline Monitoring Report which will be included within the 2016 Annual Report.

2.3 Review and Comparison of Monitoring Results with Performance Indicators

The Landscape and Rehabilitation Plan was approved on 11 December 2015 and baseline monitoring of performance and completion criteria is not required until after the plan has been implemented for a period of 12 months. This subsequent reporting is to be included within the 2016 annual reporting documentation.

2.4 Details of Non-compliance Matters

No non-compliance matters have been observed.

2.5 Monitoring Trends

No monitoring trends have been observed.

2.6 Project Impact Discrepancies

No discrepancies between the predicted and actual impacts of the project were observed with regard to Landscape and Rehabilitation matters.

2.7 Measures to Improve Project Performance

No necessary measures to improve project performance were identified for the current monitoring period as these matters are to be addressed in the Baseline Monitoring Report which is to be prepared after the initial 12 months of the implementation of this plan.

3. CONCLUDING COMMENTS

The Landscape and Rehabilitation Plan for the project was only recently approved on 11 December 2015. This preliminary monitoring report has been prepared to fulfil the requirements of the project approval, the baseline monitoring report required under the plan is to be provided within 12 months of the plan approval and submitted as part of the 2016 Annual Reporting.

Appendix 8

HERITAGE INSPECTION REPORT

Insite Heritage Pty Ltd

Grant Sands Annual Review – Heritage

Conditions of Consent Compliance
The Cultural Heritage Management Plan – submitted and approved by the Department of Planning in October 2015.

Cultural Heritage Monitoring
2.13.2 Cultural Heritage Monitoring Reporting
The monitoring of the sites will be undertaken upon completion of the protective fencing and signage of the site Grants Road RE1 or one year after approval (25th July 2015) which ever arises first.

The inspection was undertaken by Liz Wyatt, Archaeologist Insite Heritage Pty Ltd, 17th July 2015. The inspection found that the sandstone block wall, 8m perimeter fencing and signage have been erected as per the CHMP and Statement of Commitments.

An additional barrier fence around the perimeter of the sandstone exposure was also noted. This additional barrier fence has been erected to ensure that no inadvertent impacts to the rock exposure occur during maintenance activities (i.e. grass cutting) within the fenced zone. The fence is free standing and rests on top of the ground. As the additional fence is erected within the 8m perimeter fence it is the responsibility of the quarry owners to ensure that there are no inadvertent impacts of the additional fence on the rock exposure. The signage is also in place.

Plate 1 Outer perimeter fence (steel dropper) at 8m from the site and inner additional barrier

There are no previous years monitoring with which to compare this report at this time.

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

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

2016 Monitoring
Monitoring of the Grant Sands sites and the Howes Reserve sites will be undertaken in the second half of 2016.

Appendix 9

WASTE MANAGEMENT AND MINIMISATION

Grants Road Sand Quarry

Grants Rd Sand
P: 0418 116 861
F: 02 4372 1332
270 Grants Rd, Somersby NSW 2250

Grants Rd Sand Waste Management and Minimisation Strategy

All waste generated by Grants Road Sand Quarry is managed by way of Council collection services or via appropriately licensed waste contractors. No on-site disposal of general waste occurs. GRSQ is committed to the waste hierarchy where emphasis is placed upon reducing, re-using and recycling prior to disposal of its wastes. In order to minimise the generation of waste and maximise re-use of waste products, where practicable, the following practices will continue to be implemented on site:

- all waste oil will be collected and stored in containers within a covered and bunded area, and will be removed from the site by an appropriately licensed contractor.
- scrap metal and ground engaging tools will be deposited into a dedicated skip bin for periodic collection and recycling;
- diesel fuel will be stored within a self bunded above ground tank
- silt will be periodically removed from the various silt control structures and placed/stored in the product stockpile area or overburden materials for use in progressive rehabilitation;
- all office paper and general waste originating from the office, amenities building, and packaging from routine equipment and vehicle maintenance consumables will be placed in appropriate containers for collection by Council or a licensed contractor for disposal/recycling at an appropriate waste management facility;
- waste water from the amenities will continue to be treated and disposed of via the septic tank with absorption trenches/pump-out; and
- all water utilised in sand washing is continuously recycled back through the washplant

  With these controls in place, it is expected that the impacts associated with waste generation and disposal resulting from the Project can be effectively managed.

December 2015