Land Use Conflict Risk Assessment

Extractive Industry (Quarry), Asphalt/Bitupave and Ron Southon Depot & Proposed Residential Subdivision
Lot 83 DP 239781
No 77 Teven Road Alstonville

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Lot 83 DP 239781
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Prepared for: Ahbood Pty Ltd and Mt Moriah Pty Ltd
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1. Introduction

Tim Fitzroy & Associates has been engaged by Aboohd Pty Ltd and MJ Moriah Pty Ltd to undertake a Land Use Conflict Risk Assessment (LUCRA) for land described in real property terms as Lot 83 DP 239781, No 77 Teven Road, Alstonville (see Site Locality Plan **Illustration 1.1**). This report has been prepared to accompany a Development Application for a proposed residential subdivision. A Site Plan of the proposed development is provided in **Illustration 1.2**.

We understand that the proposed residential development will be located within Council's *Buffer to Extractive Industries (*Ballina Shire Council Combined Development Control Plan 2012 Chapter 2 General and Environmental Considerations*)* of:

- 500m for residential development where blasting does not occur; and
- 1000m for residential development where blasting does occur.

The above default buffers reflect the *Living and Working in Rural Areas Handbook* (Department of Primary Indutries et.al 2007) guidelines.

We note that the subject site is approximately 440m from the Tuckombil quarry and 350m from Boral Asphalt plant operations. In addition Ron Southon Blasting Contractor operates their office and depot on the same site as the quarry and asphalt plant.

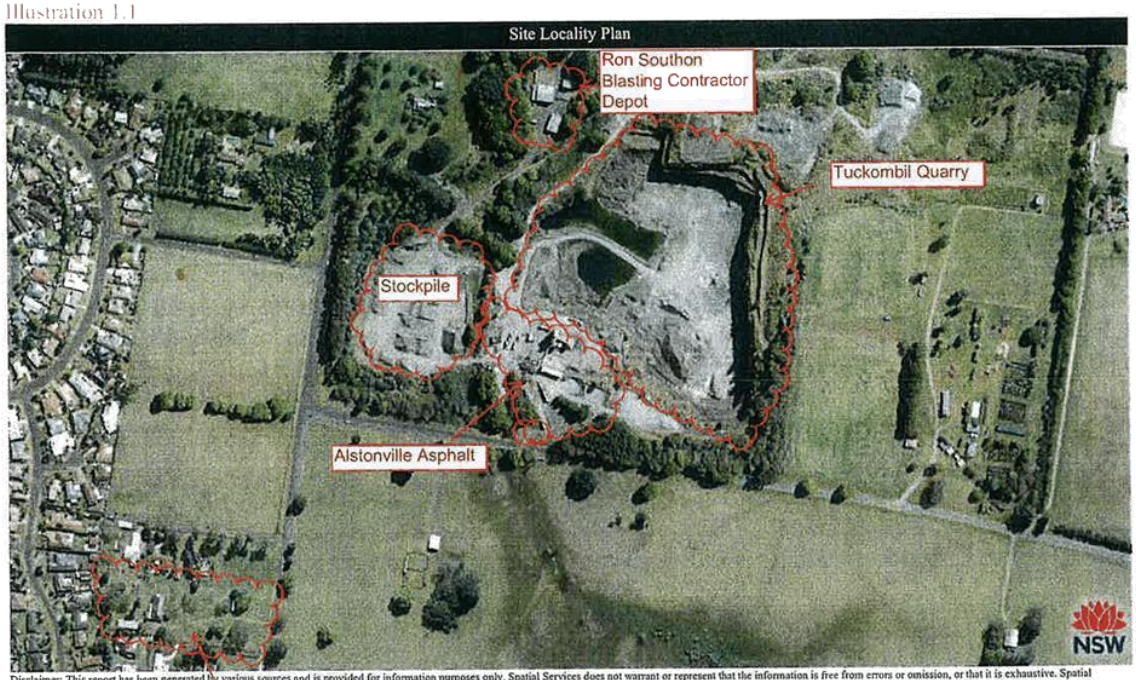
Given the Tuckombil Quarry, at Lot 2 DP 1130300 at the corner of Gap Road and Teven Road in Alstonville is an extractive industry that undertakes blasting and is located within the default 1,000m buffer to the proposed residential subdivision, it has therefore been duly identified as a *Potential Land Use Conflict*. Whilst there is no specific buffer for the Asphalt plant given the nature of the industry, there is a potential land use conflict with the proposed residential development.

The Ron Southon Blasting Contracting Office and Depot is located some 585m north of the proposed residential subdivision. No specific buffer applies to this use and therefore a LUCRA is not triggered. No significant land use conflicts are envisaged with respect to the location of the Ron Southon Blasting Contracting Office and Depot and the proposed residential subdivision at 77 Teven Road Alstonville.

The *Living and Working in Rural Areas Handbook* (NSW DPI et. al 2007), in particular Chapter 6 Development Control, provides guidance in the assessment and mitigation of potential land use conflict matters and has been used as a resource for this Land Use Conflict Risk Assessment.

This report has been prepared to assist Council in assessing potential land use conflicts between the development application for the proposed residential subdivision at 77 Teven Road Alstonville with the Tuckombil Quarry and the Alstonville Asphalt Plant.

Illustration 1.1



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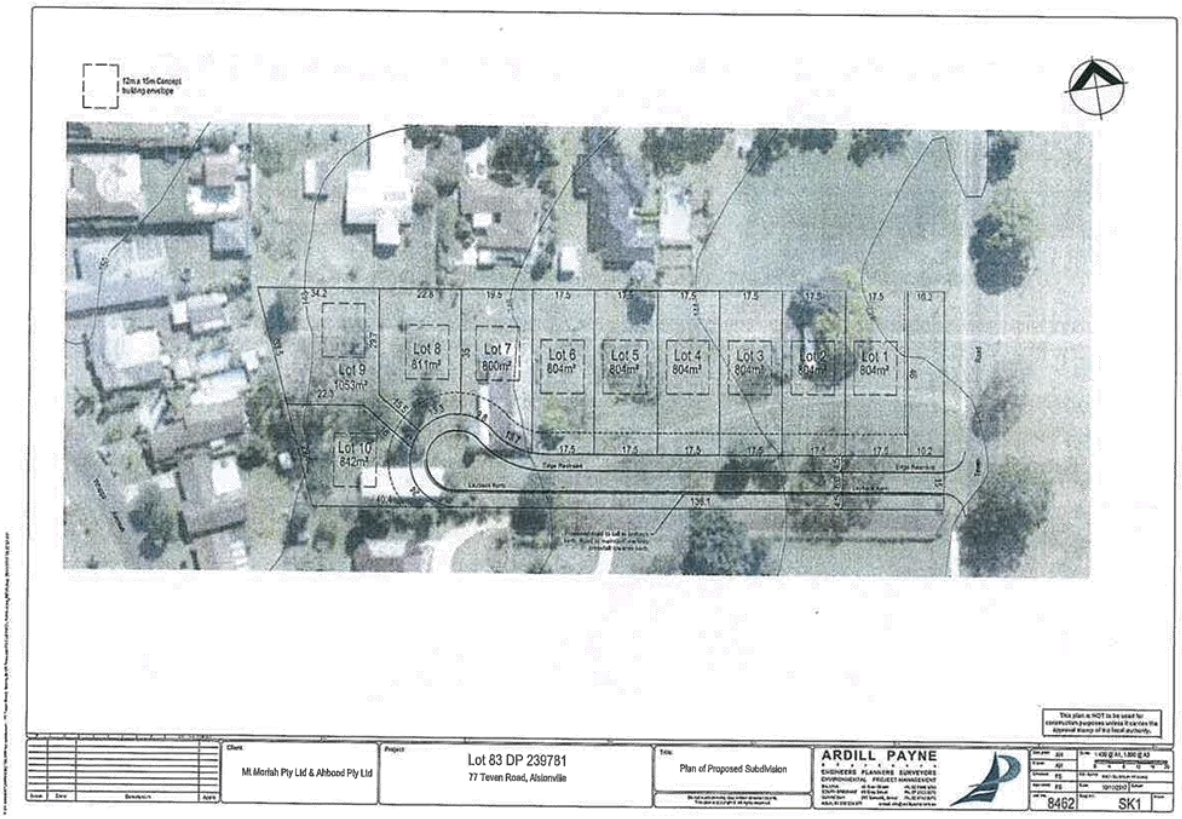

12m x 15m Concept building envelope
Lot 9 1053m²
Lot 8 811m²
Lot 7 800m²
Lot 6 804m²
Lot 5 804m²
Lot 4 804m²
Lot 3 804m²
Lot 2 804m²
Lot 1 804m²
Lot 10 842m²
Client
Mt Morish Pty Ltd & Ahbood Pty Ltd
Project
Lot 83 DP 239781
77 Teven Road, Alstonville
Title
Plan of Proposed Subdivision
ARDILL PAYNE
ENGINEERS PLANNERS SURVEYORS
ENVIRONMENTAL PROJECT MANAGEMENT
8462
SK1

1.1 Scope of Works

This assessment has been undertaken to determine the potential land use conflicts between the proposed residential subdivision at Lot 83 DP 239781 No. 77 Teven Road, Alstonville and the existing Tuckombil Quarry and Boral Asphalt Plant, located at Lot 2 DP 1130300 at the corner of Gap Road and Teven Road in Alstonville. The tasks involved in undertaking this assessment were to:

Step 1: Gather information

- Determine the nature of the land use change and development proposed.
- Assess the nature of the precinct where the land use change and development is proposed.
- Appraise the topography, climate and natural features of the site and broader locality
- Undertake a site history search, review the previous environmental assessments and approvals for the Tuckombil Quarry and Boral Asphalt Plant
- Conduct site inspection
- Undertake discussions with the property owner of 77 Teven Road Alstonville
- Describe and record the main activities of the adjoining quarry and asphalt plant and their regularity, including periodic and seasonal activities that have the potential to be a source of complaint or conflict.

Step 2: Evaluate the risk level of each activity

- Record each activity on the risk assessment matrix, and identify the level of risk of a land use conflict arising from the activity.

Step 3: Identify the management strategies and responses that could help lower the risk of the issue resulting in a dispute and conflict

- Identify management strategies for each activity
- Prioritise Strategies
- Provide Performance targets for each activity

Step 4: Record the results of the LUCRA

- Summarise the key issues, their risk level, and the recommended management strategies

2. Gather Information

2.1 Nature of the land use change and development proposed

The subject site is legally described as Lot 83 DP 239781 No. 77 Teven Road, Alstonville. The site has a total of 1.123 hectares in area, and has existing access off Teven Road. The site has a gradual slope from the west down to the east towards Teven Road. The site is cleared land at an elevation of approximately 136m AHD. The site includes an existing dwelling and shed and adjoins residential development to the north, south and west. Grazing land is located to the east. Panorama residential estate exists some 90m to the south-east.

The proposed development involves the subdivision of Lot 83 DP 239781 into 10 residential allotments.

2.2 Nature of the precinct where the land use change and development is proposed

2.2.1 Tuckombil Quarry

The closest point of the proposed residential subdivision is about 440m south-west of the limit of Quarry operations. Tuckombil Quarry is located at Lot 2 DP 1130300 at the corner of Gap Road and Teven Road in Alstonville. The subject land is owned and operated by Ballina Shire Council. A site context diagram is provided in **Illustration 2.1.**

The property has an area of 23.56 hectares. The quarry has been in operation since 1908.

Following submission of a detailed Environmental Impact Statement (EIS) (Jim Glazebrook and Associates 1995) for the operation in 1995, approval was granted (DA 1995/276) for the total extraction of 450,000m^3 or operation for 10 years, whichever is achieved first. Annual extraction rates since 1989 have varied between a maximum of 111,600 tonnes (in 1993) to a minimum of 35,000 tonnes, extracted during 2004.

The Tuckombil deposit consists of basalt overlying an ash/clay base. The surface of the basalt has been weathered into a firm shale which in turn is covered by clays and fine soils. The method of extraction is the standard hard rock drilling and blasting method. The quarry products produced at the quarry consist of:

- Spalls;
- Metal dust;
- 5mm aggregate;
- 10mm aggregate;
- 14mm aggregate;

- 20mm aggregate;
- 40mm aggregate;
- Pre-coated aggregate;
- Crusher run;
- Overburden.

The following processes are undertaken at the quarry:

- Drilling, blasting and removal of rock by heavy earth moving equipment
- Crushing of new material
- Screening and storage of crushed material
- Transportation of material from the site

In October 2004, approval was granted pursuant to Section 96 of the Environmental Planning and Assessment Act 1979 to extend the life of the quarry beyond the 10 years specified in the original consent (see **Appendix A**).

In August 2012, a second application was made to amend the development consent as it related to the blasting regime undertaken at the quarry, to ensure that the blasting occurs in accordance with contemporary blast practices.

The site is located in a predominantly rural area with the immediate neighbouring land uses comprising of rural residential and agricultural pursuits. Urban development exists approximately 300m to the south of Gap Road (approximately 400m from the extraction pit). The land adjoining the quarry on the eastern boundary comprises sporting fields and also owned by Ballina Shire Council.

The quarry is drained by Branch Creek which starts from a spring in grazing land south of Gap Road and drains through the western portion of the site. The majority of stormwater falling within the quarry (or its associated working areas) during rainfall events drains to the extraction area, which acts as a collection sump. The stockpile area to the west of the site, however, drains toward smaller collection areas within the adjacent grassed reserve, before overflowing into Branch Creek. The location of these sedimentation ponds are shown on **Illustration 2.2** Operational Plan.

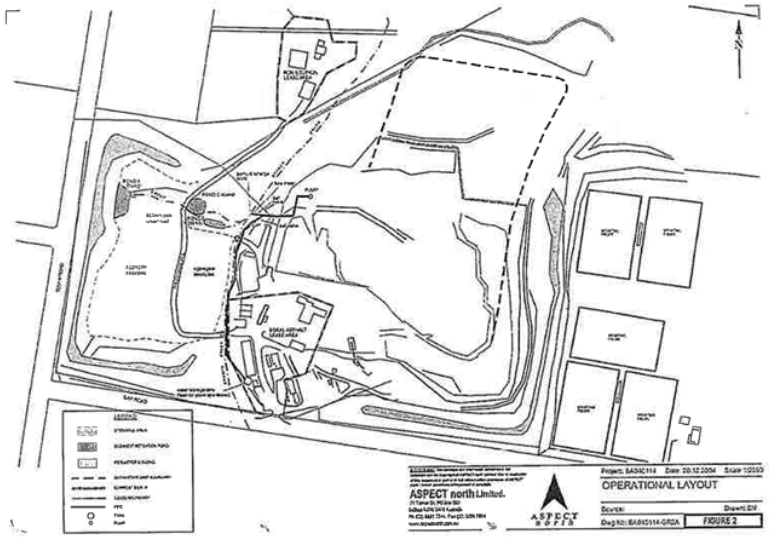
All residences in the locale are at least 500m from the workable area of the quarry and are shielded by an effective visual and noise buffer, created by perimeter mounds which have been constructed around the majority of the current working area. A southern bund wall has been installed along Gap Road toward the entrance gate to ensure visual screening of the entire southern boundary. In addition, revegetation particularly along the eastern boundary has been undertaken.

Any existing vegetation remaining on the site has been extremely disturbed in the past and contains a large proportion of exotic and native regrowth species. The original EIS included data from Blastronics which divided the site into blast zones based on distances from adjoining residences and specified a set of extraction design parameters for each zone. The Section 96 application lodged in August 2012 amended the blast methodology to reflect contemporary practices. The updated methodologies are documented in the Orica Reports contained at **Appendix B**.

The approved hours of operation of the quarry are between 7am and 5pm, Monday to Friday, and 7am to 3pm on Saturdays.

Illustration 2.1 Site Context (Source Newton Denny Chapelle)

Illustration 2.2 **Operational Layout (Tuckombil Quarry, Boral Asphalt and Ron Southon Blasting)**



2.2.1.1 Environmental Management

The Tuckombil Quarry Environmental Management Plan (EMP) is used to guide site environmental management as part of the quarry's development consent. It is supported by associated management plans and the terms of the site's environment protection licence (EPL) (see **Appendix C**).

The EMP was updated during 2013 to align with current environmental standards and community expectations. EMP Update 2013 has been prepared in response to the conditions of development consent applied to the quarry via Development Consent DA 1997/276 (as amended).

EMP Update 2013 is largely based on the EMP for the quarry prepared by Aspect North in 2005. Changes between the two versions of the document relate predominately to the following:

- Sections 1 "Background" and 2 "Introduction" – These Sections of the EMP have been updated to reflect current circumstances;
- Section 4.3 "Blasting and Vibration Management" – This Section has been updated to reflect a revised blasting regime compliant with contemporary blasting practice; and
- Section 4.7 "Neighbour Communication Strategy".

The EMP (NDC 2013) aims to identify both existing and potential future environmental considerations relating to the project and surrounding area, and to minimise any potential impacts.

Operation of the quarry is also subject to compliance with Environment Protection Licence (EPL) 3856 issued by the Environment Protection Authority (EPA), now NSW Office of Environment and Heritage (OEH), under the NSW Protection of the Environment Operations Act 1997.

The principal objectives of the amended EMP are to facilitate:

- compliance with the Development Consent conditions and the EPL; and
- the sustainable management of quarry operations

The EMP is based on a series of tables, including details on the person responsible, the management measures, monitoring, corrective actions and reporting requirements for each aspect.

Dust Management

Responsible Person	Quarry Manager
Management controls	1. Two dust deposition gauges shall be installed and monitored to evaluate the effectiveness of control measures. 2. During periods of dry weather, stockpiles (both active and inactive), loading areas and exposed surfaces should be monitored for onsite dust generation to determine the extent of any additional control measures necessary. 3. When necessary, the crushing and screening plants are to use water sprays at the primary crusher dump bin, conveyor transfer points and the screening plant. 4. The use of chemical wetting agents for dust suppression is to be avoided if possible, due to the risk of runoff losses into Branch Creek. 5. When loading, dusty materials should be sprayed with water and truck loading shall occur with minimum drop heights. 6. All loads shall be covered prior to being taken offsite. 7. If ongoing dust nuisance becomes an issue, gravel paving of additional exposed areas may be necessary in areas to reduce silt and runoff. 8. A mobile water tank should be available at the site for periodic use along the access road (200-300m) during peak periods of production. 9. Vegetation "buffer" zones (along perimeter bunds) need to be maintained around the quarry and enhanced with further plantings when possible. 10. Any crushing or screening shall incorporate a set of spray controls and wind barriers designed to provide effective dust control. 11. Management will be aware of site conditions and appropriate steps will be taken when necessary to control the dust from site operations.
Monitoring	• Regular visual site monitoring by quarry manager. • Should complaints be made regarding onsite dust control, the results from the dust deposition gauges will be considered and appropriate action will be undertaken.
Corrective Action	When necessary, the source of dust will be identified and appropriate actions taken.

Noise Management

Responsible Person	Quarry Manager
Management controls	1. Traffic movements and work hours will be limited to 7:00am and 5.00pm Monday to Friday and 7.00am and 3.00pm on Saturday. 2. Management will be aware of site conditions and appropriate steps will be taken when necessary to control the noise generation from site operations.
Monitoring	• Regular visual site monitoring by quarry manager for particularly noisy activities.
Corrective Action	Where necessary, the source of offending noise will be identified and appropriate actions taken, including altering the time of day that the activity is undertaken to minimise impact to neighbouring properties.

Blast Management

Responsible Person	Quarry Manager
Management controls	1. Blast methodologies shall be in accordance with the framework outlined in the Orica Quarry Services Report entitled Blasting Impacts Review at Tuckombil Quarry Dated 20 August 2012 as well as the "Site Law" documented within the Seismic Assessment Report Dated 2 May 2013. Copies of these reports are provided at **Appendix 1** of this EMP. 2. Blast Parameters shall be in accordance with the "Tuckombil Blast Parameter Guidelines" as provided in **Table 1**. 3. Ground vibration is to remain below 5.0mm/s for 95% of blasts with an absolute limit of 10.0mm/s. 4. Air overpressure is to remain below 115dBL for 95% of blasts with an absolute limit of 120dBL. 5. Blasting should only be undertaken between 9.00am and 3.00pm weekdays. No blasting on Saturday, Sundays or public holidays. 6. Prior to drilling, a Blast Summary Data Report is to be provided to the Quarry Manager which certifies that the proposed blast complies with the approvals for the site. If the blast design is adjusted following drilling and probing of the blast holes, an updated Blast Summary Data Report is to be provided to the Quarry Manager.
Monitoring	• Disturbance monitoring shall be undertaken at adjacent residences to demonstrate the degree of compliance achieved by blasting with respect to environmental disturbance limits. • Blast monitoring is to be undertaken by an independent third party contractor. • Permanent monitoring blocks are to be installed at nearest sensitive residences. • Recorded information to be documented during each blast to include: 1. Blast location within quarry. 2. Blast geometry (burden, spacing, hole diameter). 3. Charging parameters (explosive use, column charge detail). 4. Initiation sequence. 5. Rock yield. 6. Disturbance monitoring results (vibration, air overpressure). 7. Community notification compliance.
Corrective Action	If disturbance limits (ground vibration and/or overpressure) have been exceeded, blast designs (including reducing the blasthole explosive charge) shall be adjusted to ensure compliance is maintained.

Surface Water and Erosion Control

<table>
<tr><th>Responsible Person</th><th>Quarry Manager</th></tr>
<tr><td>Management Controls</td><td>
1. Management of site waters from the eastern side of the site shall include grading of surface areas to direct waters to the extraction pit.
2. Where site waters cannot be directed to the extraction pit (ie. western side of site), earthen bunds shall direct site waters to sediment retention ponds as detailed on Figure 2, to contain and treat waters prior to release. Pond sizes as follows to be maintained:
<table>
<tr><th>Pond Number</th><th>Surface Area (m²)</th><th>Depth of Settling Zone (m)</th><th>Settling Zone Volume (m³)</th><th>Sediment Storage Volume (m³)</th></tr>
<tr><td>1</td><td>62</td><td>0.6</td><td>37</td><td>37</td></tr>
<tr><td>2</td><td>58</td><td>0.6</td><td>35</td><td>35</td></tr>
<tr><td>3</td><td>32</td><td>0.6</td><td>19</td><td>19</td></tr>
</table>
3. The cleaning regime of the sedimentation ponds shall be determined by a "Full of Sediment" marker placed within each basin to show when less than design capacity occurs and sediment removal is required. Collected sediment to be extracted and graded for reuse where possible or otherwise disposed of appropriately.
4. Water within extraction area and the sedimentation ponds is to be reused onsite where possible.
5. Placement of rock within internal dish drains may be necessary to reduce soil erosion.
6. The volume of pumped discharge waters to Branch Creek shall not exceed 1,500kL/day from the pit.
</td></tr>
<tr><td>Monitoring</td><td>
• Discharge monitoring of waters for the following:
<table>
<tr><th>Parameter</th><th>Maximum Limit</th></tr>
<tr><td>pH</td><td>6.5-8.5</td></tr>
<tr><td>Suspended solids</td><td><50mg/L</td></tr>
<tr><td>Oil and Grease</td><td><10mg/L</td></tr>
</table>
• Record rainfall from rain gauges following any rain event.
• Regular monitoring, following rainfall events for:
o sediment level in sedimentation areas.
o efficacy of rock rubble in site drains.
• Event based inspection checklists to be completed to monitor the efficacy of control devices (a copy of a sample checklist has been included as Appendix 1).
• Quarterly characterisation monitoring to take place on the contained pit waters for pH, suspended solids, oil and grease, total nitrogen and total phosphorous.
</td></tr>
<tr><td>Corrective Action</td><td>Identify reason for deterioration in surface water quality and assess site conditions if necessary.</td></tr>
</table>

Archaeological and Heritage

Responsible Person	Quarry Manager
Management Controls	If items such as stone artefacts, bone or other cultural materials are believed to have been discovered than works at and adjacent to the material must stop. The District Office of the DEC and the Aboriginal Land Council must be informed. Works should not recommence until approval is granted by both bodies.
Monitoring	Monitoring of new areas prior to stripping.
Corrective Action	As directed by NSW DEC.

Revegetation

Responsible Person	Quarry Manager
Management Controls	1. Any topsoil stripped during the expansion of works, not sold, is to be stockpiled for use in perimeter bunding and revegetation. 2. Dense vegetation 'buffer zones' shall be maintained around the quarry as the surface area expands. 3. Rehabilitation of completed areas shall occur where possible in accordance with a Rehabilitation Plan. 4. A Rehabilitation Plan is to be prepared by October 2006. 5. Any existing species which are suspected of being vulnerable, rare or threatened are discovered, NSW DEC is to be immediately consulted.
Monitoring	Monitoring of new areas prior to stripping activities.
Corrective Action	As directed by NSW DEC.

Neighbourhood Communication Strategy

Responsible Person	Quarry Manager
Management Controls	1. Interested persons will be invited to register with the quarry operator to receive updates concerning quarry operations; 2. Those persons on the register will be notified via email and/or broadcast text message with respect to a forthcoming blast as follows: a. not less than 1 week prior to a scheduled blast; b. not less than 24hours from the scheduled blast; and c. not less than 1hour from the scheduled blast. If a blast is delayed or "carried over" to the following day, those on the register will be notified as soon as practical after the decision to delay the blast. On the morning of the rescheduled blast, notification shall be provided to those persons on the register not less than 1hour from the rescheduled blast. 3. Signage shall be erected on Teven Road not less than 1 week prior to a scheduled blast. 4. Two local residents will be appointed community liaison representatives and will be provided with copies of both the Pre-Blast Design Parameters and the Post-Blast Monitoring Results. ***Note 1:*** *Where a person does not have access to either a mobile phone or email, it is open to that person to nominate a family member or friend to receive the message and relay the information to the effected resident.*
Monitoring	Notification compliance to be incorporated into blast monitoring records.
Corrective Action	If necessary, Quarry Manager to ensure agreed notifications occur.

Monitoring and Record Summary

Dust Gauges	Inspect and report 3 monthly.
Complaint Summary	Maintain on site, record any complaints.
Blast Records	Include all information for each blast.
Rainfall	Install rain gauge & maintain records.
Discharge	Monitor for pH, SS and oil & grease as per EPA Licence on discharge. Record quantities of discharge/date.
Pit Water Quality	Quarterly monitoring for pH SS Oil & Grease Total N Total P

2.2.2 Boral Asphalt Alstonville

Operations

Boral Alstonville Asphalt has been producing materials for road and other surfacing projects since the late 1970s. Although the technology associated with production has improved markedly over this time, the basic production process has remained largely the same.

- **Feeding the plant** - the aggregates are transferred from stockpiles at the western end of the site by a front end loader and placed into storage bins. They are then transferred into the plant via conveyor.
- **Drying** - the aggregates enter the plant's drum dryer where moisture is removed using heated air. This process produces steam which is emitted through the plant's stack.
- **Coating** - the heated aggregates leave the drum dryer and enter a mixer where they are combined with the 'fillers' and coated in bitumen.
- **Pug mill** - the mixture is then rotated in a 'pug mill' to produce the final asphalt.
- **Transport** - the required amount of asphalt is discharged from the plant via a loading chute. The hot asphalt product is then taken directly to the customer's work site - it must remain at between 150 and 180 degrees Celsius to be successfully placed (or laid).

Production Materials

Production materials used in the operation and which are stored on the site are-

MATERIAL	QUANTITY	USE
Aggregates	Various	Asphalt Production
Dust	Various	Asphalt Production
Sand	Various	Asphalt Production
Filler (Flyash)	45 tonnes	Asphalt Production
Bitumen Emulsion	4,000 litres	Sealing during paving
Bitumen Hot	45,000 litres	Asphalt Production
	22,000 litres	(2 types of bitumen)
Diesel Fuel	11,000 litres	Vehicle fuel
Diesel Flux	51,000 litres	Asphalt Production
Fuel L.P.G.	2 X 7,480 litres	Heating of aggregate
Asphalt Hot	200 tonnes	Product

The major raw material components are aggregate and dust which is stored in aggregate bins and hoppers is delivered by 25 tonne truck.

Flyash filler is delivered from Ipswich by 20 tonne truck and is stored in a silo. Bitumen is delivered by 20 tonne truck from Brisbane and is stored in heated tanks. As well as production and delivery of asphalt, Boral also maintains a depot for its paving operations on the site. This generally involves the storage, maintenance and cleaning of associated plant including:

- 1 paver for asphalt laying;
- 2 runabout trucks (approx. 3 tonne capacity)
- rollers for asphalt laying

Asphalt Production
The plants produce various grades of asphalt for road building. The basic asphalt production process for a batching plant can be described as follows:

- Raw materials transported to the site and stored adjacent to the plant.
- A front end loader feeds the aggregate components (typically five (5) different size fractions are used) into five (5) cold feed bins which weigh the various fractions onto a cold feed conveyor.
- The cold feed belt discharges into a drum dryer which heats the components to approx. 170°C to remove moisture. The dryer is fuelled by L.P.G. and the exhaust is discharged to a dust collector.
- The dryer discharges hot aggregate onto an elevator which feeds a screen to separate the material into different sized storage hoppers.

- A batch weigher measures the required fraction from each storage hopper and weighs it into a mixer. The filler component is weighed from the filler silo.
- After the component addition is complete, a 20 second dry mix is undertaken in a rotating pug mill. A second unit 20 second mix occurs after the addition of the bitumen. The asphalt is then discharged and emissions collected by a dust collector.
- The asphalt is conveyed by a hot feed system into storage bins and fed into trucks via clam gates.

Hours of operation
Activities at the Boral Alstonville Asphalt plant generally only take place between **6am** and **6pm Monday** to **Saturday**. The plant's conditions of consent, however, do allow for operations to be conducted across 24 hour periods up to **60** days each year. When this provision is being used, there can be **no more than four consecutive days** of 24 hour operations.

Boral also has the ability to apply to do 'emergency works' at any time. Approval must be gained from both Ballina Shire Council and the Environment Protection Authority (EPA). 'Emergency works' may include Sundays and public holidays. The plant is **not** permitted to conduct 'normal' or 24 hour operations on Sundays or public holidays unless as part of 'emergency works'. After discussion with the community during 2016, Boral agreed to place forward notice of any planned use of the '24 hour' provisions on the **home page** of their website.

Leasing arrangements
The Boral Alstonville Asphalt plant occupies land within the Tuckombil Quarry. The quarry is owned by Ballina Shire Council. The asphalt plant site is leased by Boral from Ballina Council. Boral's current lease concludes at the end of 2020.

Boral Alstonville Asphalt - General approvals
The Boral Alstonville Asphalt plant is operated under an approval granted by Ballina Shire Council in March 1995. The consent (**DA 1995/127**) sets out the operating and environmental conditions the plant must comply with throughout its operational life. Subsequent to 1995, Boral has received approval for four modifications to the original consent.

Reporting and public documents
In many cases, the planning consents to which Boral's operational sites are managed require various reporting to be compiled, and documentation to be made publicly available. At times, the site may also voluntarily report information about its operations and environmental performance. The Boral Alstonville Asphalt Plant does **not** have any current compulsory obligations in this regard.

The closest point from the Boral Asphalt plant to the proposed residential development is about 300m.

Environmental Management

Air Quality
The Alstonville asphalt plant is designed to operate as a batching-type asphalt plant. This means that during a typical production run, asphalt is produced in approximately three tonne batches.

Consequently, not all plant processes operate or emit odour emissions on a continuous basis and at a constant rate. The plant operates in response to the demand for its product. Road construction and maintenance is conducted by a range of customers at varying times, including varying hours of the day and on different days of the year, including weekends. Consequently, the plant needs to maintain operating flexibility in order to meet the requirements of its customers.

Asphalt is produced for road construction on a 'just in time' manufacturing basis. The asphalt is required to remain above a set temperature threshold that is specific to the product being produced and the distance it has to travel to the customer, in order for it to maintain the required properties for production, transit to site and application by the end user. Consequently, production rate and temperature are important considerations in the production process and the odour impact assessment.

The total hours of production during the previous financial year, 1 July 2016 – 30 June 2017, was 242.9 hours (equivalent to 2.77% of the year), during which the total annual asphalt production was 16,172.11 t. The hourly breakdown of asphalt production for the 2016-17 year is presented graphically in Figure 3-1 (Air Environment Consulting 2017) The typical plant opening hours are between 6am and 3pm when 71% of the asphalt was produced in 2016-17. However, the production data shows that 73% of the asphalt was produced between the hours of 8am and 4pm, when total production was greater than 500 t in each hour. The other key production time is between 8pm and 11pm as road construction work is often scheduled at night when road use is reduced. This period accounts for 13% of the production by hour. Outside of these hours, production was well below a total of 500 t for each of the hours during the year and accounted for 14% of the total. The plant's average hourly production rate is approximately 75 t/h, with a maximum rate of 100 t/h.

Air Environment Consulting was commissioned by Boral National (Boral) in June 2017 to undertake an odour impact assessment of the Alstonville asphalt plant during normal production. The asphalt plant has intermittently received complaints from the local community about odour emission releases over many years. In response to these complaints, Boral implemented an Air Quality Management Plan (AQMP) in 2014 that included the installation of an activated carbon filtration system to treat odour emissions released from the Bitumen Kettles / Holding Tanks during tanker loading.

According to Air Environment Consulting (2017) this odour control system has been highly effective at reducing emissions from this source. Notwithstanding this, the NSW Environmental Protection Authority (EPA) has noted that there have been verified odour complaints associated with asphalt production and handling under certain conditions since the implementation of the Bitumen Holding Tank odour control units.

To investigate the odour issue, an odour impact assessment comprising source odour sampling and laboratory olfactometry analysis was conducted in accordance with the relevant Australian standards (including AS4323.3 [2001] and AS4323.4 [2009]) and NSW Approved Methods techniques. An odour emissions inventory was then

developed for use in a CALPUFF odour dispersion modeling assessment, conducted in accordance with the NSW Approved Methods and CALPUFF modelling guidance.

The odour impact assessment determined that ground-level odour concentrations associated with air emissions from all stack and fugitive sources combined were predicted to comply with the EPA odour impact assessment criterion at all sensitive receiver locations. This assessment was conducted on the basis of the plant's license conditions that allow for its operation during every hour of the year.

In reality, the potential for the facility to cause odour impact was expected to be significantly lower than that assessed, as the plant only operated for 2.77% of the recent 2016-17 financial year. The assessment also determined that emissions associated with the Dryer Kiln stack were the largest contributor to ground-level odour concentrations in sensitive residential areas adjacent to the plant.

The second most important odour emission source was determined to be the truck load out facility for asphalt product. This conclusion was primarily due to the large difference in odour emissions between the two source types, where emissions from the stack were determined to be 20,444 OU/s compared to approximately 75 OU/s from all asphalt production sources combined. Also important to this finding was the configuration of the stack that was determined to be affected by turbulence generated by the flow of wind around the nearby plant buildings and structures that were of similar height to the top of the stack.

Notwithstanding the plant's compliance with the odour impact assessment criterion, in acknowledgement of the odour complaints from the community, Air Environment Consulting recommended that further investigations are conducted into their cause. These investigations would include:

- A series of ambient odour assessment surveys to be conducted around the plant and in the local community during production periods to track the odour plume and record its intensity,
- The keeping of an odour complaint log to assist in odour investigations including the establishment of a direct phone line that the community can use to register odour complaints,
- Liaison with the local community by Boral Alstonville operators to investigate the odour impact immediately upon the receipt of a complaint, and
- The analysis of wind and production conditions at the time of complaints based on data recorded at the on-site AWS.

Road Traffic Impacts

In October 2016 EMM Consulting Pty Limited (EMM) were engaged by Boral to conduct a road traffic noise assessment relevant to the asphalt plant located at 498 Gap Road, Alstonville to satisfy Condition 25 of DA 1995/127 (Amendment No. 4). The plant operates under Development Consent No. 1995/127 (as amended) issued by Ballina Shire Council (Ballina Council) on 30 March 1995.

Condition 25 of Amendment No. 4 (Approved on 10 August 2016) states;

Prior to the sourcing of aggregates and fines from proposed sources other than the adjoining Gap Road Quarry, a traffic noise assessment report prepared in accordance

with the requirements of appendix B of the NSW Road Noise Policy must be submitted to and approved by council.

The main transport route used by road trucks to travel between Boral's Teven quarry and the Alstonville asphalt plant is via Gap Road, Teven Road and North Teven Road. (See **Illustration 2.3** Road Haulage Routes). To quantify existing total traffic movements on the transport route, the daily traffic volumes have been determined from a seven day tube traffic count undertaken during the period of 14 to 21 December 2014. The count was undertaken approximately 100 metres to the north of the intersection at Gap and Teven Roads.

EMM completed seven days of unattended noise monitoring to establish existing road traffic noise levels on Teven Road. The logger was placed adjacent Teven Road, approximately 100m north of the intersection of Greenie Drive and Teven Road. The logger microphone was positioned approximately 15 metres from Teven Road.

EMM has completed a road traffic noise assessment to satisfy Condition 25 of DA 1995/127 (Amendment No. 4). Road traffic noise levels were assessed against the relevant assessment criteria from the RNP (EPA 2011) relevant to residential land uses. It was found that predicted operational road traffic noise levels satisfy the relevant RNP noise requirements at all nearest assessment locations on the transport route.

Illustration 2.3 Road Haulage Route Alstonville Asphalt (Source EMN, 2016)

Traffic route and noise monitoring location
Boral Asphalt Plant, Alstonville
Road traffic noise assessment

Operational Noise Management

In August 2017 Muller Acoustic Consulting Pty Ltd (MAC) were commissioned by Boral (NSW) Pty Limited to complete a Noise Monitoring Assessment (NMA) for the Alstonville Asphalt Plant. The NMA was completed to quantify operational noise emissions of the plant within the surrounding community to ascertain compliance with relevant noise criteria.

The assessment was conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA) 2000, Industrial Noise Policy (INP);
- Standards Australia AS 1055.1:1997 - Acoustics - Description and measurement of environmental noise - General Procedures; and
- 160816 Alstonville Asphalt MOD3 Conditions (August 2016).

The plant is located on Gap Road, Alstonville, NSW and is surrounded by rural and residential land uses. Dwellings in the local area are predominantly residential with traffic noise from Teven Road dominant and local wildlife noise also present.

The plant is used to batch asphalt for use at infrastructure projects within the surrounding area. The process uses raw materials stored onsite and utilises an asphalt burner and bitumen kettles to produce asphalt which is exported from site via road trucks. The plant is enclosed using metal sheeting panels and is at a lower reduced level (RL) than the surrounding receivers.

Four representative residential catchment areas were selected for this assessment and are summarized below:

- Location R1 is situated at Calypso Court, Alstonville, NSW, approximately 500m south-east of the plant. R1 is representative of residents on Calypso Court and the greater Granada Parade catchment area.

- Location R2 is situated on Greenie Drive, Alstonville, NSW, approximately 450m west of the plant and is representative of the Greenie Drive and Tanamera Drive catchment area.

- Location R3 is situated at the boundary of 1353 Teven Road, Alstonville, NSW. This location is approximately 430m north-west of the site and representative of all receivers to the north of the plant along Teven Road.

- Location R4 is situated in the car park of the Alstonville Hockey Club, which is situated 450m to the east of the plant. This location is representative of the receiver catchment to the east of the plant.

The plant, receivers/catchment areas are presented in **Illustration 2.4.**

Illustration 2.4 **Noise Monitoring Locations (Muller Acoustic Consulting Pty Ltd 2017)**

Table 13 presents the measured Boral contribution to the ambient environment at each monitoring location assessed against the day, evening and night PSNL derived from the INP assessment methodology.

Table 13 Industrial Noise Policy Compliance Assessment

Receiver	Operational Noise Level Contribution LAeq(15min) dBA		PSNL LAeq(15min) dBA			Compliant		
	Day	Evening/Night[2]	Day	Evening	Night	Day	Evening	Night
R1 (Calypso Court)[1]	31	41	38	35	35	✓	X	X
R2 (Greenie Drive)	<30	34	38	35	35	✓	✓	✓
R3 (Teven Road)	Nil	<30	38	35	35	✓	✓	✓
R4 (Hockey Club)	<30	<30	38	35	35	✓	✓	✓

Note 1 Includes 5dB modifying factor for low frequency as per the INP.

Note 2 Evening and night assessed against same criteria

Noise from the project was above the relevant PSNL by 1dBA at R1. Taking into account the modification factors as per Section 4 of the INP, this equates to a 6dB contribution above the evening/night PSNL. Remaining measurements demonstrated compliance with relevant PSNLs for all assessed locations during day, evening/night periods.

It is noted that the noise contribution at R1 was obtained during the presence of a north- east wind and should be considered a worst case scenario. Furthermore, the plant does not undertake regular night time operations; typically night operations are limited to several occasions per year pending market demands.

Complaints

On 1 September 2017 the EPA responded to a request from Ballina Shire Council seeking further details on complaints to the EPA's *Environment Line* with respect to the operation of the Boral Asphalt Plant, 540 Gap Road, Alstonville. The EPA provided a Table (see extract below) with a list of complaints received from January to June 2017. The complaints numbered 7 in total and related to 4 events (3 in May and 1 in January). The complaints related to odour and noise. The location of the receivers is unknown. There is no evidence that the complaints have been independently verified.

Details of the calls Environment Line concerning Bitupave Boral Asphalt Jan - June 2017

Incident Date/Time	Call Taken	Call Type	Boral Asphalt-Bitupave Alstonville Jan-June 2017 reports	Incident Location
24/05/2017 11:59:00 PM	24/05/2017 04:59:00 PM	300 NOISE/VIBRATION - 304 NON-LICENSED (EPA ARA) - Noise/vibration	Caller affected by night time noise from the Boral plant, machinery rumbling "Like a spaceship landing" - the noise is hard to describe. The caller notes that at this time of year the prevailing wind is generally from the direction of the plant. The caller typically stays up till around midnight, and the noise was present throughout the evening and as they were getting to sleep. Ongoing issue - the caller would appreciate quiet enjoyment of their home during the evening.	Boral/Bitupave, 498 Gap Road (de-listed premises)
15/05/2017 12:00:00 AM	23/05/2017 01:23:00 PM	300 NOISE/VIBRATION - 304 NON-LICENSED (EPA ARA) - Noise/vibration	The caller has been impacted by night-time noise from the asphalt plant, particularly on the evening of the 15th May up until about midnight when the caller finally got to sleep despite the noise. The noise comprised machinery noise, such as clunking and rumbling. On Wednesday the 17th the noise was also present until at least around midnight, but to a slightly lesser degree compared to the 15th May.	Boral/ Bitupave, 498 Gap Road (de-listed premises) Alstonville, noise impact to resident of Trinidad Court
15/05/2017 12:00:00 AM	16/05/2017 03:27:00 PM	300 NOISE/VIBRATION - 303 INDUSTRIAL - Odour Noise/vibration	Complaint of noise coming from Bitupave (old license #959), Gap Road Alstonville. The site is permitted to operate all night for 60 days a year but caller felt that noise levels were well over 5dba above background levels. Noise was a problem Monday 15th and Wednesday 17th May. Noise seemed to be louder before midnight. The noise was very intrusive. The caller noticed an odour last night for the first time.	Bitupave (old license #959), Gap Road Alstonville
17/05/2017 08:45:00 PM	18/05/2017 01:36:00 PM	200 AIR ODOURS - 203 INDUSTRIAL - Odour	Caller affected by strong bitumen odour from about 8.45pm last night, compelling the caller to close up the house . The caller also noted that the plant was audible as working when the caller was outdoors - this is unusual, they can't usually hear it. There was little wind at the time.	Boral/ Bitupave, 498 Gap Road (de-listed premises), odour impact to resident of Whipps Avenue Alstonville
17/05/2017 09:30:00 PM	18/05/2017 07:13:00 AM	200 AIR ODOURS - 203 INDUSTRIAL	After hours call Ref 144617 : Strong odour coming from Boral Asphalt Plant. Ongoing issues. Noticed last night 17/5/17 at 21:30 Strong fresh asphalt smell.	Odour from Bitupave/ Boral Asphalt, Gap Road, Alstonvile - EPL 959
17/05/2017 07:00:00 PM	18/05/2017 09:32:00 AM	300 NOISE/VIBRATION - 303 INDUSTRIAL - Odour Noise/vibration	Bitupave, Gap Road, Alstonville - EPL 959 Odour and noise affected caller at home last night at 41 Whipps Ave. Unpleasant petrochemical odour like oil or grease. Noticed between 7-10pm then caller went to bed. The odour was very strong even though he had sinus problems. Also noticeably loud noise, general plant operating noise. Odour strength = 5/6. Wind: light breeze, east or nor-east.	Bitupave, Gap Road, Alstonvile - EPL 959, Odour and noise affected caller at home last night at 41 Whipps Ave.
16/01/2017 10:00:00 AM	16/01/2017 12:56:00 PM	200 AIR ODOURS - 203 INDUSTRIAL	Very strong tar/bitumen odours from Boral Asphalt, Gap Rd, Alstonville. The odour was noticed today 16/1/17 from 10am and it is still present and its 13.00. Caller said the odour usually lasts for hours and it is very hot day today and rated the strength as 5 very strong. Caller cannot open the doors or windows nor can caller go outside to enjoy the gardening Caller has been living at her property for 6 years and said its always been an issue. Please contact caller.	Very strong tar/bitumen odours from Boral Asphalt, Gap Rd, Alstonville.

2.2.3 Topography, Climate and Natural Features

The RL of the proposed development site falls from west to east from about 66m RL and 61m RL.

The soils within the subject site are generally red basaltic – landscape variant. They are generally deep well drained alluvial kransozem, described as the Wollongbar soil landscape group by Morand (1992).

The site is situated within the sub-tropical climatic zone and the climate can be described as humid sub-tropical, characterised by hot, humid summers and mild winters. Rainfall is seasonally distributed, being concentrated mainly in the summer months.

The annual wind rose (Figure 8-2) indicates that the modelled winds tend to be well distributed throughout the sectors with the prevailing winds blowing from the south-southeast to southeast sector.

Winds also frequently arrive from the south-west and north to north-north-east sectors but rarely flow from the north-west to west-north-west sectors. Calm conditions, where the wind speed is lower than 0.5 m/s, are rare occurring on only 0.4 % of occasions, with the annual mean wind speed being 3.2 m/s.

The lightest winds tend to arrive from the south-east quadrant. The diurnal wind distribution is presented in Figure 8-3 and shows that stronger winds are more common during the day, with more instances of south-south-easterly and south-easterly winds during the afternoon. At night winds most frequently arrive from the south-west quadrant. Figure 8-4 shows that during summer and autumn winds are more likely to originate from the south-south-east and south-east, with south-westerly and northerly winds prevailing during winter and spring respectively.

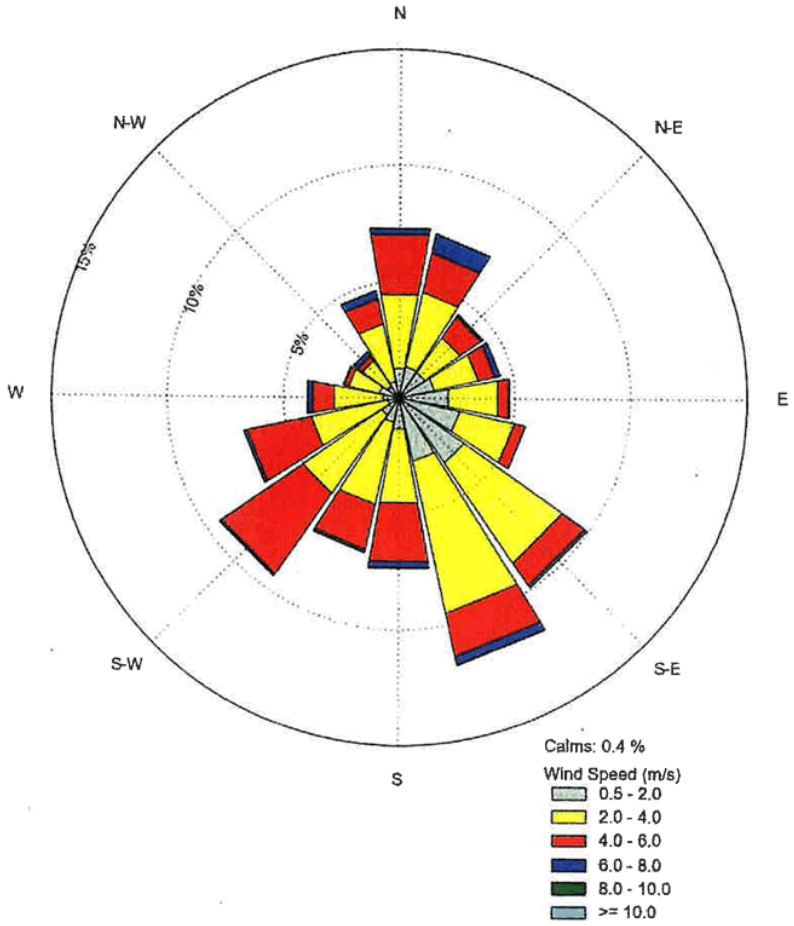


Figure 8-2 Annual distribution of winds at the site

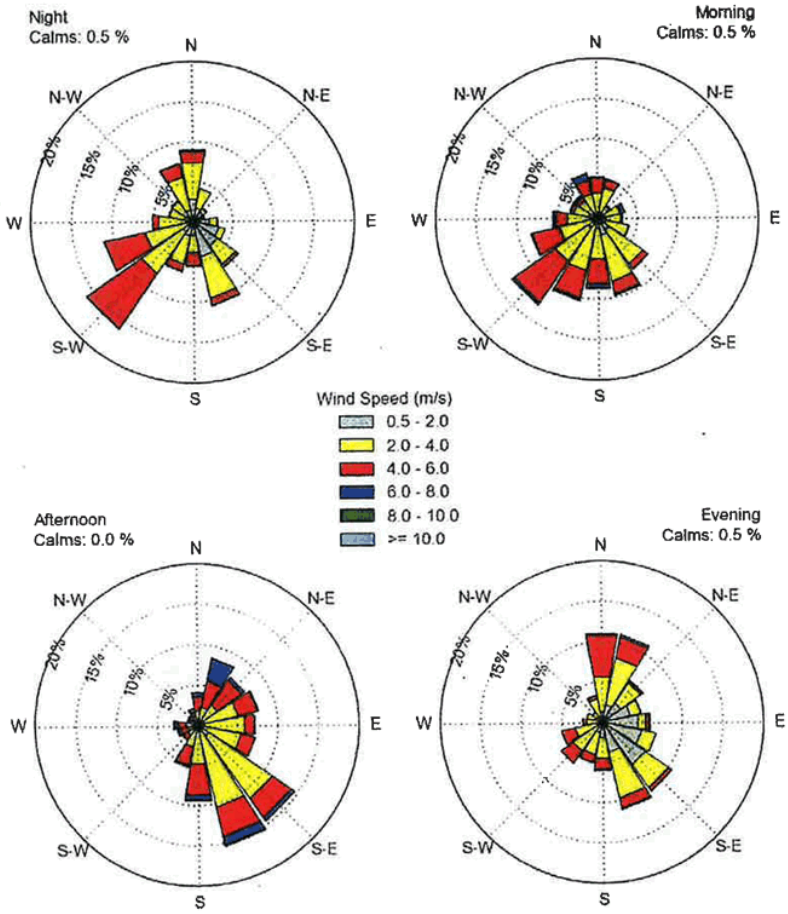


Figure 8-3 Diurnal distribution of winds at the site

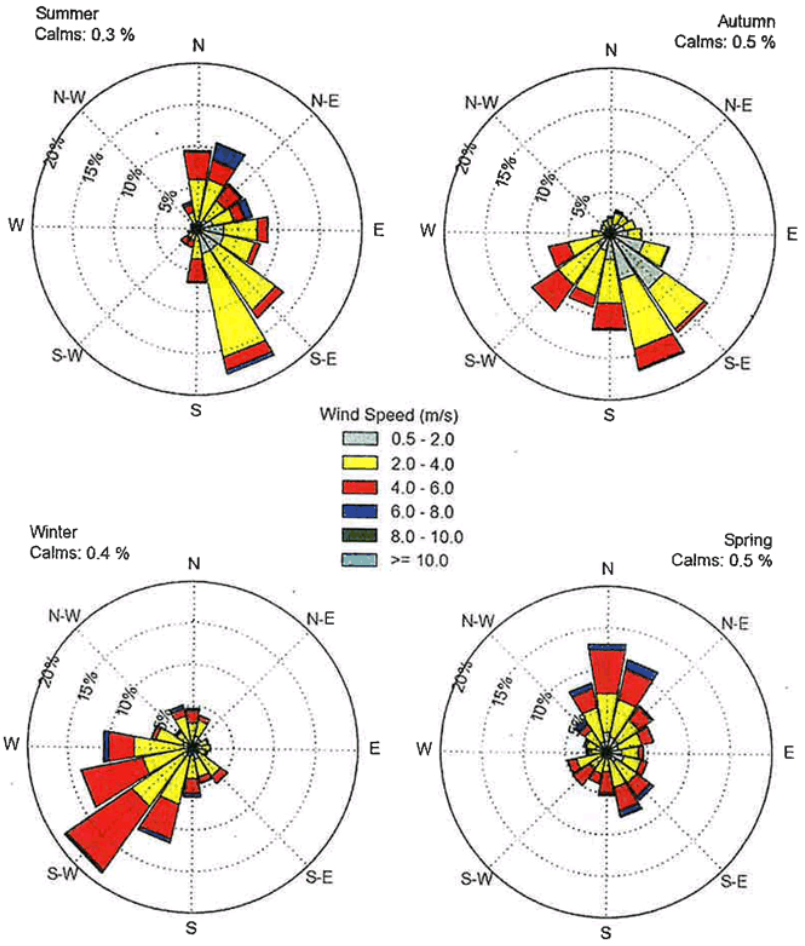


Figure 8-4 Seasonal distribution of winds at the site

The mean annual, seasonal and diurnal wind speeds and proportion of calms are presented in Table**8-1**

Table 8-1 Annual, seasonal and diurnal mean wind speeds

Period	Mean Wind Speed (m/s)	Calms (%)
Annual	3.2	0.4
Summer	3.2	0.3
Autumn	2.6	0.5
Winter	3.4	0.4
Spring	3.4	0.5
Night: Midnight to 6am	2.8	0.6
Morning: 6am to Midday	3.3	0.6
Afternoon: Midday to 6pm	3.8	0.1
Evening: 6pm to midnight	2.7	0.6

2.2.4 Site Inspection

In October 2017 an inspection was undertaken of the subject site and the entry of the Boral (Teven) Quarry. The quarry was in operation whilst the site inspection was being undertaken. Observations recorded during our site inspection did not reveal any distinguishable impacts from quarrying operations on the subject site.

There was no impact from the key environmental impacts of noise, vibration or dust from the quarrying or asphalt activities during the site inspection.

2.2.5 Potential Land Use Conflicts

The following key items have been identified as potential land use conflicts between the quarry operations and any future dwellings in the proposed development:

2.2.5.1 Scale of Existing Quarry Development

Tuckombil Quarry

Following submission of a detailed Environmental Impact Statement (EIS) (Jim Glazebrook and Associates 1995) for the operation in 1995, approval was granted (DA 1995/276) for the total extraction of 450,000m^3 or operation for 10 years, whichever is achieved first. Annual extraction rates since 1989 have varied between a maximum of 111,600 tonnes (in 1993) to a minimum of 35,000 tonnes, extracted during 2004.

Boral has applied for Council to re-examine its Development consent to continue operation for a further 20 years from February 2017 for an annual production of 500,000 tonnes. The current annual production rate is between 250 000 and 300 000 tonnes.

Boral Alstonville Asphalt

Notwithstanding this, the plant is designed to operate as a batching-type asphalt plant. This means that during a typical production run, asphalt is produced in approximately three tonne batches.

The total hours of production during the previous financial year, 1 July 2016 – 30 June 2017, was 242.9 hours (equivalent to 2.77% of the year), during which the total annual asphalt production was 16,172.11 t. The plant's average hourly production rate is approximately 75 t/h, with a maximum rate of 100 t/h.

2.2.5.2 Operating Days and Hours

Tuckombil Quarry

The approved hours of operation of Tuckombil Quarry are:

- 7am to 5pm Monday to Friday
- 7am to 3pm Saturdays

Boral Alstonville Asphalt

Activities at the Boral Alstonville Asphalt plant generally only take place between **6am** and **6pm Monday** to **Saturday**. The plant's conditions of consent, however, do allow for operations to be conducted across 24 hour periods up to **60** days each year. When this provision is being used, there can be **no more than four consecutive days** of 24 hour operations.

Activities carried out on the land and road systems pursuant to Development Approval 95/127 shall only be undertaken between 6.00 am to 6.00 p.m.

2.2.5.3 Noise Impacts

Tuckombil Quarry

Current quarrying operations utilize a range of mobile and fixed plant equipment. This includes:

- Jaw crusher;
- Secondary crusher;
- Secondary screen;
- Tertiary screen;
- Excavator
- Front End Loader;
- Haul truck;
- Delivery truck;
- Water cart;
- Dozer; and
- Drill rig.

The dozer and drill rig are used on a campaign basis (i.e. one a month for about a week) and are therefore not used everyday.

Boral Alstonville Asphalt

Noise is sourced from operational activities and road transport related to delivery of raw product and export of finished product to market.

A summary of the findings of the Richard Heggie Noise Impact Assessment included in the EIS (Glazerbrook (1995)) is provided below:

A summary of findings and recommendations from the report are as follows:-

- Noise due to the asphalt plant is inaudible except at the closest residence, lot 3 DP 588893 Teven Road. At this location the plant is audible during lulls in quarry activity, with pronounced low frequency tones. Typically however quarrying activity (crushing) masks the noise.

- Noise from upgraded plant should be required to meet a limit of 65 dBA at 60 metres in the direction of the closest affected residence. This may require some attention to the type of burner head selected, attenuation of fan exhaust and inlets and possibly some treatment at the burner inlet.

- The daytime background noise level (L_{A90}) was established as 35 dBA. To meet the noise guidelines of the N.S.W. E.P.A. the average maximum level of noise due to the operation of the upgraded asphalt plant should not exceed 40 dBA at worst affected residential locations. Plant noise level specifications to meet this requirement are set out in the report. Short term noise events, of duration less than six minutes, are acceptable up to a level of 55 dBA.

- Extension of the existing bund wall along the southern perimeter of lot 3 DP 588893, to a height of at least 2.5 metres above natural ground level (to a ground contour level of approx.145 m AHD), should be considered. This would reduce both quarry and asphalt plant sourced noise.

- The contribution of noise from trucks associated with the operation of the asphalt plant will not be of significance provided Teven Road, between Gap Road and the Bruxner Highway, is maintained in a good state of repair. Similarly, vibration generated by the activity of trucks is not of concern. The use of an open graded asphalt road surface is recommended for future levels of traffic activity (year 2000+).

2.2.5.4 Transport

A summary of the findings of the Martin Findlater and Associates Noise Impact Assessment included in the EIS (Glazerbrook (1995) is provided below:

The traffic report examines the cumulative impacts of both the Boral Asphalt plant and Council's quarry operations in the context of :

- The existing traffic environment
- Traffic generation characteristics and haul routes
- Traffic impacts on surrounding roads
- Necessary infrastructure upgrading

Teven Road carries approx. 95% of all asphalt plant and quarry generated traffic from Gap Road south through to the Bruxner Highway. Gap Road is a two lane rural road. Immediately south and to the north of the site Teven Road is a two way rural road. Further to the south, through to the Bruxner Highway, Teven Road passes through an urban residential area and along this section it functions as a local collector. Teven Road, Gap Road and the Bruxner Highway are within a 60 klm speed zone.

The Teven Road/Bruxner Highway intersection conforms to an AUSTROADS Type C intersection with protected left turn lanes. The intersection of Teven Road with Gap Road conforms to an AUSTROADS Type A intersection. Traffic volumes for these roads have been estimated by way of a traffic survey (Teven and Gap Road) while Ballina Council data provided volumes for the Bruxner Highway.

The average daily and hourly truck generation rates were set out in Section 6.7. These were based on a projected average quarry production of 150,000 tonnes/year and an average asphalt plant production rate of 23,000 tonnes/year.

The asphalt plant's average yearly production is estimated to expand by 3% to 5% per annum. This growth rate equates to an average increase in the AADT of 1 to 2 each year.

Conclusions from the Traffic Report are:

- The traffic generated from the asphalt operating at an average 23,00 tonnes per year output is not calculated to have any significant impact on the haul routes nor the surrounding environment.
- The additional traffic generated from the asphalt plant arising from an annual growth rate of up to 5% is not calculated to have any significant impact on the haul routes nor surrounding environment.
- The Type A intersection of Teven Road and Gap Road has sufficient capacity should the asphalt plant and quarry operate at maximum capacity.
- Teven Road has sufficient capacity to continue to provide a Level of Service B should the asphalt plant and quarry combined operate at maximum capacity.
- The asphalt plant operating at 23,000 tonnes/year generates approx. 12% of the loadings/demands on the road system that the quarry is expected to be creating at maximum theoretical capacity of 250,000 tonnes/year.

2.2.5.5 Blast Monitoring

In 2013 Lismore City Council engaged Orica Quarry Services to conduct a seismic assessment for the Tuckombil Quarry. The seismic assessment involved firing a series of small explosive charges along the edge of the proposed extraction limit and monitoring the resultant vibration at the nearest sensitive receiver.

The nearest sensitive receiver is a residential development bordering the site, and monitoring the vibration at strategic locations in the vicinity of this development can determine site vibration transmission characteristics and ultimately, maximum charge weights to allow the development of a Site Law.

This information is critical to generating an accurate understanding of the blasting parameters required to comply with the site's environmental licence limits for blast induced vibration. According to the site's EPL 3856 the environmental limit for ground vibration is 5 mm/s for 95% of blast events, with a maximum of 10 mm/s and the air overpressure limit is 115 dBL for 95% of blast events, with a maximum limit of 120 dBL.

The seismic assessment determined that blasting in close proximity to the nearest sensitive receiver known as Monitor #1 is achievable. However, a number of recommendations have been given in order to ensure that this can occur.

- Future blast monitoring data is gathered and added to this seismic assessment to further refine the site law.
- Limit blast charging to 2 decks in any one hole. This may involve limiting bench heights in some areas.

- Implementation of the Unitronic Electronic Blasting System to enable single hole/single deck firing critical to meeting vibration limits
- Ensure all this information is used in conjunction with other influences on the blasting event such as boretrak results, survey information, and weather events.

For each blast event on site, blast monitors should be placed at 4 sites surrounding the quarry to capture vibration and overpressure data. The nearest sensitive receiver is the residence on Teven Road. The monitor located at this property is known as Monitor #01. Monitor #02 is located at the rear boundary of residences on Tanamera Drive. Similarly, Monitor #03 is located at the rear boundary of residences on Granada Parade and Monitor #04 is located at the nearest residence to the east of the quarry on Gap Road (see Illustration 2.5 Blast Monitoring Locations).

The residence at Monitor #01 is in particularly close proximity to the quarry and historically has had higher environmental readings as a result of blasting events. Therefore, the main focus of the seismic assessment is to determine appropriate methods for the control of blast induced ground vibrations at this location.
In previous reports on blasting at Tuckombil Quarry, the residence at Monitor #01 may have been referred to as the "Schmidt Residence".

Illustration 2.5 Overview of Tuckombil Quarry and locality with Blast Monitoring Locations (Source Orica Quarry Services 2013)

2.2.5.6 Air Quality

Tuckombil Quarry

Air quality impacts as a consequence of excavation, crushing, stockpiling, blasting and heavy vehicle movement are a potential source of land use conflict between the existing quarry and the proposed development.

Alstonville Asphalt

Air quality is likely to be affected by emissions of odours and dust. Likely sources of these emissions are :

- The Plant
  - stack emissions - particulates, gases, moisture, and odorous compounds
  - silo emissions - fine particulates
  - fugitive petroleum vapours, bitumen fumes, dusts, gases and odorous compounds
- The Site
  - fugitive dust from site surfaces, bins, conveyors, stockpiling, loading and unloading and haulage roads

2.2.5.7 Other environmental impacts

Numerous other environmental impacts of the existing quarry on the environment have been noted including flora and fauna, water quality, aboriginal and european heritage , traffic movement and drainage however it is our view these that these matters do not trigger a potential source of future conflict between Tuckombil Quarry, the Alstonville Asphalt Plant and the proposed development.

This view is based on:

- The distance from the proposed development to the outer limit of quarry excavation (445m);
- The distance from the proposed development to the outer limit of Alstonville Asphalt (345m);
- All drainage from the quarry discharges remotely from the proposed development site; and
- The volume and direction of vehicle movements is not deemed to confer a significant impact on future residents of the proposed development.

3. Land Use Conflict Risk Assessment

3.1 Introduction

In this report, a risk assessment matrix is used to rank the potential Land Use Conflicts in terms of significance. The matrix assesses the environmental/public health and amenity impacts according to the:

- Probability of occurrence; and
- Severity of impact.

The procedure of environmental/public health & amenity hazard identification and risk control is performed in three stages:

1. Environmental/public health & amenity hazard identification,
2. Risk assessment and ranking,
3. Risk control development.

Procedure:

1. Prepare LUCRA Hazard Identification and Risk Control form.
2. List all hazards associated with each activity.
3. Assess and rank the risk arising from each hazard before "controls" are applied on the LUCRA form.
4. Develop controls that minimise the probability and consequence of each risk using the five level methods. Record these controls on the form.
5. Re-rank each risk with the control in place to ensure that the risk has been reduced to an acceptable level. If the risk ranking is not deemed to be acceptable consideration should be given to whether the proposed activity should be allowed to proceed.

3.2 Risk Assessment and Risk Ranking

It is necessary to differentiate between an 'environmental hazard' and an 'environmental risk'. 'Hazard' indicates the potential for harm, while 'risk' refers to the probability of that harm occurring. For example, the presence of chemicals stored in a building is a hazard, but while the chemicals are stored appropriately, the risk is negligible. **Table 3.1** defines the hazard risks used in this report.

The Risk Ratings (severity of the risks) have been established by assessing the consequences of the risks and the likelihood of the risks occurring.

Table 3.1 Measure of Consequence

Level	Descriptor	Description	Examples/Implications
1	Severe	• Severe and/or permanent damage to the environment • Irreversible with management	• Damage or death to animals, fish, birds or plants • Long term damage to soil or water • Odours so offensive some people are evacuated or leave voluntarily • Many public complaints and serious damage to Council's reputation • Contravenes Protection of the Environment & Operations Act and the conditions of Council's licences and permits. Almost certain prosecution under the POEO Act
2	Major	• Serious and/or long-term impact to the environment • Long-term management implications	• Water, soil or air impacted badly, possibly in the long term. • Limited damage to animals, fish or birds or plants • Some public complaints Impacts pass quickly • Contravenes the conditions of Council's licences, permits and the POEO Act • Likely prosecution
3	Moderate	• Moderate and/or medium-term impact to the environment • Some ongoing management implications	• Water, soil or air known to be affected, probably in the short term • No damage to plants or animals • Public unaware and no complaints to Council • May contravene the conditions of Council's Licences and the POEO Act • Unlikely to result in prosecution
4	Minor	• Minor and/or short-term impact to the environment • Can be effectively managed as part of normal operations	• Theoretically could affect the environment or people but no impacts noticed • No complaints to Council • Does not affect the legal compliance status of Council

Level	Descriptor	Description	Examples/Implications
5	Negligible	• Very minor impact to the environment • Can be effectively managed as part of normal operations	• No measurable or identifiable impact on the environment

This report utilises an enhanced measure of likelihood of risk approach1 which provides for 5 levels of probability (A-E). The 5 levels of probability are set out below in **Table 3.2.**

Table 3.2 Probability Table

Level	Descriptor	Description
A	Almost certain	Common or repeating occurrence
B	Likely	Known to occur, or it has happened
C	Possible	Could occur, or 'I've heard of it happening'
D	Unlikely	Could occur in some circumstances, but not likely to occur
E	Rare	Practically impossible

3.3 Risk Ranking Method

For each event, the appropriate 'probability' (i.e. a letter A to E) and 'consequence' (i.e. a number 1 to 5) is selected.

The consequences (environmental impacts) are combined with a 'probability' (of those outcomes) in the Risk Ranking Table (Table 3.3) to identify the risk rank of each environmental impact (e.g. a 'consequence' 3 with 'probability' D yields a risk rank 9).

The table yields a risk rank from 25 to 1 for each set of 'probabilities' and 'consequences'. A rank of 25 is the highest magnitude of risk that is a highly likely, very serious event.

A rank of 1 represents the lowest magnitude or risk, an almost impossible, very low consequence event.

Table 3.3 Risk Ranking Table

PROBABILITY	A	B	C	D	E
Consequence					
1	25	24	22	19	15
2	23	21	18	14	10
3	20	17	13	9	6
4	16	12	8	5	3
5	11	7	4	2	1

NOTE
A risk ranking of 25-11 is deemed as an unacceptable risk.

A risk ranking of 10-1 is deemed as an acceptable risk.

Thus, the objective is to endeavour to identify and define controls to lower risk to a ranking of 10 or below.

3.4 Risk Reduction Controls

The process of risk reduction is one of looking at controls that have and affect on probability such as the implementation of certain procedures; new technology or scientific controls that might lower the risk probability values.

It is also appropriate to look at controls which affect consequences e.g. staff supply with a mechanism to change impacts or better communications established. Such matters can sometimes lead to the lowering of the consequences.

Table 3.4 Hazard Identification and Risk Control Sheet

Work undertaking

Activity	Identified Hazard	Risk Ranking	Method of Control	Controlled Ranking
Quarrying	Noise & Vibration	B3 = 17	Noise and vibration impacts from quarrying activities are likely to be the greatest potential source of conflict between residential use and blasting excavation, crushing, blasting, stockpiling and heavy vehicle transport Prior to August 2013, Tuckombil Quarry was required to operate in accordance with the Environmental Management Plan (EMP) prepared by Aspect North and dated July 2005. From August 2013, the quarry was required to operate in accordance with the EMP prepared by Newton Denny Chapelle, dated August 2013. The core difference between the two documents related to Blast and Vibration Management and Community Communication Strategies. Measures to reduce noise	D4 = 5 Acceptable

			impacts include: • Distance Attenuation: the closest point from the proposed residential subdivision to the extent of excavation at Tuckombil Quarry is approximately 445 metres • Topographical shielding: The excavation plan for the quarry ensures that the proposed development will be protected by the excavation. There is no direct line of sight between the proposed development and the active face of the quarry • Quarrying activities are set significantly below ground level and the proposed development will be shielded from noise emissions during excavations Site operating hours generally occur between 7am and 5pm, Monday to Friday, and 7am to 3pm on Saturdays. The hours of operation of the quarry are between 7am and	

			5pm, Monday to Friday, and 7am to 3pm on Saturdays. Complaints received in late 2010/early 2011in relation to noise were identified and appropriate actions taken Changes to Blast Methodologies in accordance with Orica Mining Report (2013) have been implemented. Significant efforts have been made to ensure future blasting is undertaken in accordance with contemporary practices and in a manner compliant with the vibration and overpressure limits for the quarry. There is no evidence of any noise complaints from existing residents regarding quarrying activities over the last 6 months of operation. The results of Blast monitoring indicates compliance at the nearest affected residence which is located some 160m north from the excavation limit of Tuckombil quarry.	

Quarrying	Particulate Matter Dust	C3 = 13	Potential sources of dust include: • Soil removal and handling • Ripping, pushing and loading raw materials • Dry processing activities • Internal transportation of raw materials • Stockpiling, loading and transportation of products and • Exposed surfaces Measures to reduce dust impact include: • Distance Attenuation: the closest point from the proposed residential subdivision to the extent of excavation at . Tuckombil Quarry is approximately 445 metres • Topographical shielding: The excavation plan for the quarry ensures that the proposed development will be protected by the excavation. There is no direct line of sight between the proposed development and the active face of the quarry	D4 = 5 Acceptable

			Existing dust suppression measures at the site include using water sprays in the crushers and conveyor discharges and a water truck on internal quarry roads. • A dust monitoring program has been established to examine the effects of quarry expansion on deposition levels. Two dust deposition gauges have been installed onsite and are monitored on a quarterly basis to evaluate the effectiveness of control measures. • Use of dust suppression, to temporarily dampen the surfaces during protracted dry and high wind periods. • Progressive rehabilitation of areas exhausted or not required for quarrying. • During periods of dry weather, stockpiles (both active and inactive), loading areas and exposed surfaces are monitored for onsite dust generation to determine the extent of any additional control measures necessary. • When necessary, the	

			crushing and screening plants are to use water sprays at the primary crusher dump bin, conveyor transfer points and the screening plant. • When loading, dusty materials are sprayed with water and truck loading shall occur with minimum drop heights. • All loads are covered prior to being taken offsite. • A mobile water tank is used at the site for periodic use along the access road (200-300m) during peak periods of production. • Vegetation "buffer" zones (along perimeter bunds) need to be maintained around the quarry and enhanced with further plantings when possible.	
Asphalt Plant	Noise & Vibration	B3 = 17	Noise and vibration impacts from asphalt activities are a potential source of conflict with the proposed residential development. Activities at the Boral Alstonville Asphalt plant generally only take place between 6am and 6pm	D4 = 5 Acceptable

			Monday to Saturday. The plant's conditions of consent, however, do allow for operations to be conducted across 24 hour periods up to 60 days each year. When this provision is being used, there can be no more than four consecutive days of 24 hour operations. Measures to reduce noise and vibration impact include: • Distance Attenuation: the closest point from the proposed residential subdivision to the Alstonville Asphalt Plant is approximately 350 metres • There is no direct line of sight between No 77 Teven Road and the Alstonville Asphalt Plant • The plant is enclosed using metal sheeting panels and is at a lower reduced level (RL) than the surrounding receivers. Independent noise monitoring of the Alstonville Asphalt plant and road traffic noise impacts has been undertaken.	

			Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) on behalf of Boral (NSW) Pty Limited for Alstonville Asphalt Plant, Alstonville, NSW. The assessment was completed to quantify site noise emissions and to determine compliance against relative criteria derived in accordance with the INP. Attended monitoring has identified that operational emissions generated by the plant were 1dBA above relevant criteria at R1 during the evening and night-time period. Additionally, further analysis identified a 5dB modifying factor was applicable. Overall results identified that the project contribution was 6dB above the PSNL for R1 during the evening and night period. Furthermore, the elevated levels were measured during a north-east wind directing plant emissions to R1. Northerly winds would be considered to be worst case meteorology conditions with respect to	

			enhancing site emissions at R1. The noise emissions from the project satisfied the daytime criteria at R1 and relevant criteria at R2, R3 and R4 for all assessment periods. EMM has completed a road traffic noise assessment to satisfy Condition 25 of DA 1995/127 (Amendment No. 4). Road traffic noise levels were assessed against the relevant assessment criteria from the RNP (EPA 2011) relevant to residential land uses. It was found that predicted operational road traffic noise levels satisfy the relevant RNP noise requirements at all nearest assessment locations on the transport route.	
Asphalt Plant	Particulate Matter, Dust	B3 = 17	Potential sources of dust include: Silo emissions, site surface, bins, conveyors, stockpiling, loading an unloading and haulage road. The Air Quality Assessment (Envirotest 1995) confirms that the proposed new plant would	D4 = 5 Acceptable

			reduce particulate concentrations derived from particulate matter to less than 5ug/m3 300m downwind. Measures to reduce particulates include: • Use of dust suppression, to temporarily dampen the surfaces during protracted dry and high wind periods	
Asphalt Plant	Odour	B3 = 17	Odour impacts from asphalt production are likely to be the greatest potential source of conflict between Alstonville Asphalt and the proposed residential subdivision. The Boral Alstonville Asphalt Plant has intermittently received complaints from the local community about odour emission releases over many years. In response to these complaints, Boral implemented an Air Quality Management Plan (AQMP) in 2014 that included the installation of an activated carbon filtration system to treat odour emissions released from the Bitumen Kettles / Holding Tanks during tanker loading.	D4 = 5 Acceptable

			This odour control system has been highly effective at reducing emissions from this source. Notwithstanding this, the NSW Environmental Protection Authority (EPA) has noted that there have been verified odour complaints associated with asphalt production and handling under certain conditions since the implementation of the Bitumen Holding Tank odour control units. To further address recent odour complaints associated with asphalt production and handling, Boral committed to the development of a Bitumen Odour Management Plan (BOMP) for the facility. Key Odour sources include: • Rotary dryer (kiln) stack emissions, • Dumping of asphalt from the Pug Mill to the Skip Conveyor, • Conveying of the asphalt from the pug mill to the Hot Asphalt Storage Bins by the Skip Conveyor System (the skip is	

			uncovered during transit to the Hot Asphalt Storage Bins), • Dumping of asphalt from the Skip Conveyor into the Hot Asphalt Storage Bins, • Vented emissions from the Hot Asphalt Storage Bins (the Hot Asphalt Storage Bins remain uncovered throughout the process), • Dumping of asphalt from the Hot Asphalt Storage Bins into trucks, • Asphalt storage in uncovered trucks at the truck loading facility, • Asphalt storage in partially covered trucks at the site weighbridge, and • Filling of the heated Bitumen Storage Tanks (Kettles). The odour impact assessment of the Boral Alstonville facility determined that ground-level odour concentrations associated with air emissions from all sources combined were predicted to comply with the EPA odour impact assessment criterion at all sensitive receiver locations.	

			This assessment was conducted on the basis of the plant's license conditions that allow for its operation during every hour of the year. In reality, the potential for the facility to cause odour impact was significantly lower than that assessed, as the plant only operated for 2.77% of the recent 2016-17 financial year. Notwithstanding the plant's compliance with the odour impact assessment criterion, in acknowledgement of the odour complaints from the community, Air Environment Consulting recommended that further investigations are conducted into their cause. These investigations would include: • A series of ambient odour assessment surveys to be conducted around the plant and in the local community during production periods to track the odour plume and record its intensity, • The keeping of an odour complaint log to assist in	

			odour investigations including the establishment of a direct phone line that the community can use to register odour complaints, • Liaison with the local community by Boral Alstonville operators to investigate the odour impact immediately upon the receipt of a complaint, and • The analysis of wind and production conditions at the time of complaints based on data recorded at the on-site AWS. It is also recommended that additional odour sampling and testing of fugitive and stack emissions be conducted to verify the odour emissions inventory. Supplementary odour testing is recommended to monitor odour emissions variability over time and under varying conditions, and their impact in the local area would be further assessed using the odour dispersion model developed for this assessment.	

	Probability					
		A	B	C	D	E
Consequence	1	25	24	22	19	15
	2	23	21	18	14	10
	3	20	17	13	9	6
	4	16	12	8	5	3
	5	11	7	4	2	1

4. Conclusions and Recommendations

This Land Use Conflict Risk Assessment is based on:

- a thorough review of the site history of the Tuckombil quarry and adjoining Alstonville Asphalt Plant, including previous development applications and environmental assessments, and comments by council officers and state government agencies;
- site inspection; and
- discussions with the current owner of the subject site.

This LUCRA has concluded that the proposed site is suitable for a proposed residential subdivision as described in the Site Plan (Illustration 1.2) subject to the following recommendations:

- Noise Mitigation
    - As a precautionary measures given the tonal impacts of asphalt plant operation resulting in a 6dB exceedance in the evening and night periods at noise monitoring location R1 on the northern perimeter of the Panorama Estate consideration should be given to the provision of acoustic treatment of windows and the provision of air conditioning in habitable rooms to allow windows to be closed in the night and evening for dwellings in the proposed subdivision.

A number of factors have led to this conclusion including:

- distance attenuation of some 445 metres from the limit of quarry excavation to the proposed residential subdivision;
- distance attenuation of some 350 metres from the closest point of the Alstonville Asphalt Plant to the proposed residential subdivision;
- no direct line of sight between the quarry and asphalt plant and the proposed development;
- the ongoing implementation of the Environmental Management Plan for the Tuckombil Quarry,
- Boral's commitment to implement the recommendations of the Odour Impact Assessment of the Alstonville Asphalt Plant (Air Environment 2017)
- the evidence of air quality, noise and vibration monitoring, and
- the results of modelling on the effects of the asphalt plant on air quality.

The type, nature, location, times of operation and recent record of the Tuckombil Quarry and Alstonville Asphalt Plant , coupled with the site specific environmental assessments and monitoring results have led me to the view that any potential future land use conflicts between the existing quarry and asphalt plant and the future occupants of the proposed residential subdivision are acceptable.

This report has been prepared by Tim Fitzroy of *Tim Fitzroy & Associates*.

Tim Fitzroy
Environmental Health Scientist
Environmental Auditor

References

Air Environment Consulting, 2017; Boral National – *Odour Impact Assessment of the Alstonville Asphalt Plant*, Brisbane, Australia.

Ballina Shire Council, Development Consent 95/127 *The replacement of an existing asphalt batching plant with a new higher capacity plant* Lot 1 DP 880416, No. 540 Gap Road, Alstonville

Ballina Shire Council, May 2017 *Minutes of Pre Lodgement Meeting, 10 Torrens lot residential subdivision* 77 Teven Road Alstonville

Department of Primary Industries et al 2007 *Living and Working in Rural Areas-a handbook for managing land use conflicts on the NSW North Coast, NSW*

EMM Consulting Pty Limited, October 2016 *Road traffic noise assessment: Boral Alstonville*

Jim Glazerbrook and Associates, 1995 *Environmental Impact Statement Asphalt Plant at Alstonville for Boral Asphalt*

Muller Acoustic Consulting Pty Ltd, September 2017, *Noise Monitoring Assessment – Alstonville Asphalt Plant*

Newton Denny Chapelle, 2013, *Environmental Audit (2007-2013) Tuckombil Quarry Gap Road Alstonville*

Newton Denny Chapelle, August 2013, *Environmental Management Plan Update For Tuckombil Quarry at Gap Road, Alstonville*

Personal Communication 2017, Paul Worth

Copyright and Usage

A Development Approvals

Ballina Shire Council

Cnr. Cherry & Tamar Streets
P.O. Box 450, BALLINA, N.S.W. 2478
DX 27789, BALLINA
TELEPHONE No. 86 4444 (STD 066)
FAX No. (066) 86 7035

ENQUIRIES REFER

IN REPLY PLEASE QUOTE
DA-1995/127

FORM 7

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979.

NOTICE TO APPLICANT OF DETERMINATION OF A DEVELOPMENT APPLICATION

Boral Asphalt
Lenaghans Drive
BLACKHILL NSW 2322

being the applicant in respect of development application No. 1995/127 for the following use:

The replacement of an existing asphalt batching plant with a new higher capacity plant.

Pursuant to Section 92 of the Act, notice is hereby given of the determination by Ballina Shire Council of the abovementioned development application relating to land described as Lot 1 DP 186865 & Lot 1 DP 575192, Gap Road, Alstonville.

The development application has been determined by granting of consent subject to the following conditions:

1. This consent is limited to the production of asphalt from aggregate and dust obtained from the adjoining Gap Road Quarry. Where such material is obtained elsewhere an amended consent will be required.

2. The hours of operation shall be restricted to between 6.00am and 6.00pm, Mondays to Fridays and 7.00am to 4.00pm, Saturday.

3. Development of the site being carried out generally in accordance with the plans and Environmental Impact Statement prepared by *Jim Glazebrook and Associates Pty Ltd* dated 17th December, 1994 and submitted with the development application, subject to such amendment as required by any conditions specified hereinafter.

4. The development shall meet noise emission criteria, standards relating to airborne pollutants and discharge of polluted waters from the site as specified by the Environment Protection Authority.

5. All necessary licences shall be obtained from the Environment Protection Authority and lodged with Council prior to commencement of work.

cont...

D.A. 1995/127 cont...

6. Sediment control measures shall be put into place and be properly maintained to prevent soil erosion and the transport of sediment off the development site to the requirements and satisfaction of Council's Chief Engineer.

7. The control and management of waste water shall be carried out generally in accordance with the proposed Water Management Plan prepared by Envirotest dated November, 1994 to the requirements and satisfaction of Council's Chief Engineer. This plan and it's management shall incorporate the following features:-

   (a) The containment of stormwater runoff and discarded water from the plant and workshop areas and the prevention of such water entering Branch Creek.

   (b) The provision of vehicle wash down and treatment system prior to overflow to quarry.

   (c) The removal of silt from settling dams to the extent necessary to maintain 90% of wastewater design capacity.

   (d) Stormwater from undisturbed areas shall be diverted around the site.

   (e) Design details of the settlement pond shall be lodged with Council's Engineering Department for approval prior to construction.

8. The implementation of strategies to reduce dust and emissions from the proposed plant to the requirements of Council and the Environment Protection Authority. Such strategies shall include:-

   (a) The recording of details of all complaints by local residents of smell, dust or emissions.

   (b) The implementation of a dust monitoring program in accordance with AS 2724-1.

   (c) The monitoring of exhaust from the hot asphalt loading.

   (d) The monitoring of particles from the stack with the installation of a continuous monitoring device.

   (e) The construction and operation of the proposed plant to contain dust fallout at below 120-130 mg/m3/day near residential areas.

   (f) The reporting of monitoring results and recorded complaints to Council and the Environment Protection Authority every 3 months for the first year of operation and thereafter by arrangement.

   (g) The provision of baghouse filter air pollution control of the plant stacks.

9. The installation of a 10 metre stack on the mobile plant.

10. The temporary and proposed plant shall be constructed and operated so that:-

    (a) Noise is limited to 65 dBA at 60 metres in the direction of the closest affected residence.

cont...

(b) The daytime background noise level (LA90) does not exceed 40 dBA at the worst effected residential location.

(c) Short-term noise events up to 55 dBA are permitted for no more than 6 minutes.

(d) Construction noise is limited to 45 dBA at the worst affected residence.

11. The existing bund wall along the southern perimeter of lot 3 DP 588893 shall be extended to a height of at least 2.5 metres above natural ground level (145m AHD).

12. A full and detailed landscaping plan shall be submitted to Council detailing types of vegetation and maintenance programs therefore. This plan shall apply principally to the bund walls required by this consent.

13. On-site effluent disposal facilities shall be designed and constructed in accordance with the requirements of Council's Chief Health and Building Surveyor.

14. The Applicant shall widen the sealed pavement of Gap Road from the quarry entrance west to the Teven Road intersection at no cost to Council to the requirements and satisfaction of Council's Chief Engineer. The pavement shall be widened to achieve a 7.0 metre wide seal. This road widening shall be undertaken prior to installation of the mobile batching plant unless other arrangements satisfactory to Council are made.

15. The Applicant shall upgrade the intersection of Gap Road and Teven Road by improving the sight distances to the requirements and satisfaction of Council's Chief Engineer. The required sight distances to be achieved are those for a 60 kph design speed in each road. This upgrading shall be undertaken prior to installation of the mobile batching plant unless other arrangements satisfactory to Council are made.

16. The Applicant shall submit engineering drawings of all roadworks required by this consent to Council for approval prior to the installation of the mobile batching plant.

17. A road maintenance levy of $0.23/tonne of asphalt hauled from the plant shall be paid quarterly to Council. The levy is to be increased annually in accordance with the Consumer Price Index for Sydney, commencing January each year for the life of the plant. Such is to be paid in advance to an amount conforming to 5750 tonnes per quarter.

18. Truck movements to and from the site shall be prohibited from using local village streets as thoroughfares. In particular trucks associated with the use of the plant shall not use Greenie Street, Tanamera Drive and South Street as a transport route to or from the Bruxner Highway.

19. A building application shall be obtained for all proposed buildings.

20. A permit shall be obtained from the Department of Water Resources for any excavation works within 40 metres from the top of the bank of Branch Creek.

The abovementioned conditions have been imposed for the following reasons:

1. to ensure that the development is undertaken in accordance with the terms and limitations of the development application and of this consent,

cont...

D.A.1995/127 cont...

2. to ensure compliance with relevant Health and Building Code of Australia requirements,

3. to protect the existing and likely future amenity of the locality,

4. to ensure traffic efficiency and safety on the public street and to preserve the opportunity for casual on-street parking,

5. to ensure compliance with the Ballina Local Environmental Plan 1987,

6. to protect the public interest;

7. to protect the existing and likely future amenity of the locality and to attain the Objects of the Environmental Planning and Assessment Act, 1979.

THIS CONSENT IS FOR THE USE OF THE PROPERTY ONLY AND IS NOT A BUILDING PERMIT WHICH MUST ALSO BE OBTAINED FROM COUNCIL'S HEALTH & BUILDING DEPARTMENT BEFORE ANY STRUCTURAL WORK COMMENCES. THE BUILDING PERMIT WILL CONTAIN ADDITIONAL CONDITIONS.

Endorsement of the date of consent - 30th March, 1995

G.J. Faulks,
GENERAL MANAGER.

30.03.95

(See notations on reverse hereof.)

enquiries refer
Anthony Peters
in reply please quote
DA 1995/127.5

16 August 2016

ballina shire council

Mr Rod Wallace
Planning & Development Manager (NSW/ACT)
Boral Asphalt
Rod.Wallace@boral.com.au

Dear Rod

Re: Modification Application 1995/127
Lot 1 DP 880416, No. 540 Gap Road, Alstonville

I refer to the abovementioned and advise that at its Extraordinary Meeting of 10 August 2016 Council resolved:

1. *That the modification application to DA 1995/127 for the Boral Asphalt Plant be **APPROVED** via the amendment of Condition No's. 1 and 2h as requested and agreed additional conditions outlined in this report.*

2. *That the applicant be requested by Council to have a public open day of the plant within 14 days, to allow residents to see for themselves how the plant operates and thus not be reliant on the propaganda being circulated by the Alstonville Asphalt Watch.*

Resolution No. 1

In accordance with Resolution Point No.1, please find the consolidated Notice of Determination attached.

It is noted that during assessment, on the 28 July 2016 you confirmed that "...in the interest of continuous improvement, Boral will review and update the existing Odour Management Plan in line with points 2 and 3 of the NSW EPA submission above...". The referenced NSW EPA submission was that of 6 July 2016, with Points No. 2 and 3 recommending:

2. Development of a routine odour survey/monitoring program and reactive management strategy, including meteorological monitoring and the implementation of appropriate triggers to further develop the reactive management strategy for odour mitigation; and

3. Details of all proposed odour control measures including:
   (a) Timeframe for implementation of all identified odour controls;
   (b) Key performance indicator(s) for odour controls;
   (c) Responsibilities for demonstrating and reporting achievement of key performance indicator(s); and
   (d) Record keeping and complaints response register.

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Although not forming part of the modification application, it is expected that, in good faith Boral will implement these measures in consultation with the NSW EPA as part of the on-going improvement operations of the plant.

Resolution No. 2

In accordance with Resolution Point No. 2, it would be appreciated if you could provide written acceptance prior to 29 August 2016 regarding the organisation of a public open day on-site. If accepted, suitable dates/times should also be provided so that further details can be confirmed.

If you have any enquiries in regard to this matter please contact Anthony Peters on 02 6686 1254.

Yours faithfully

Rod Willis
Group Manager
Development and Environmental Health

Enc.

enquiries refer
Anthony Peters
in reply please quote
DA 1995/127.5

ballina
shire council

NOTICE TO APPLICANT OF DETERMINATION OF APPLICATION TO AMEND DEVELOPMENT CONSENT
(Issued under Clause 122(1) of the Environmental Planning and Assessment Regulation 2000)

Amendment No. 4

Bitupave Ltd
Attention Rod Wallace
Boral Property Group, PO Box 42
WENTWORTHVILLE NSW 2145

Being the applicant in respect of an application seeking amendment of Development Consent No. **DA 1995/127** for the following development:

The ~~replacement of an~~ existing asph~~alt~~ batching plant with a ~~new~~ higher capacity plant

Subject Land

Lot 1 DP 880416, No. 540 Gap Road, Alstonville

Pursuant to Clause 122(1) of the Environmental Planning and Assessment Regulation 2000, notice is hereby given that the application seeking amendment of the subject development consent has been determined on 10/08/2016 by granting **approval** to the modifications specified in this notice.

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DETAILS OF AMENDMENT No. 4

New Conditions

Condition 10d

If a written agreement cannot be reached and provided to stockpile material on the adjacent Gap Road Quarry site, a suitable stockpiling area on the asphalt plant site must be identified to Council's satisfaction prior to any stockpiling of aggregates and fines. Appropriate surface water, noise and dust controls of the identified area must be implemented to mitigate potential environmental impacts. Evidence of a formal agreement or details of a suitable stockpile location and appropriate controls on the asphalt plant site must be submitted to Council prior to the sourcing of aggregates and fines from alternative sources to the adjacent quarry.

Condition 25

Prior to the sourcing of aggregates and fines from proposed sources other than the adjoining Gap Road Quarry, a traffic noise assessment report prepared in accordance with the requirements of Appendix B of the NSW Road Noise Policy must be submitted to and approved by Council.

Condition 26

Any aggregates and fines that comprise waste materials generated outside the premises must not be received at the premises for storage, treatment, processing, reprocessing or disposal. This excludes the use of waste materials that meet the definition of Virgin Excavated Natural Material or that are subject to an exemption under Clause 91 of the Protection of the Environment Operations (Waste) Regulation 2014.

Amended Conditions

Condition 1

This consent is limited to the production of asphalt from aggregate and fines obtained from the adjoining Gap Road Quarry whilst ever the Gap Road Quarry is in operation and the aggregates and fines produced are of a suitable quality and quantity for the production of asphalt. Where the Gap Road Quarry ceases operation and/or the applicant satisfactorily demonstrates to Council that the aggregates and fines being produced at the Gap Road Quarry are not of sufficient quantity or of a suitable quality for the production of asphalt, aggregates and fines are permitted to be obtained from external sources subject to the terms and limitations of the Modification to Amend Consent application submitted to the Council on 9 May 2016, the following additional amendment to Condition 2h and otherwise the retained and applicable conditions of Development Consent 1995/127 (as amended).

Condition 2h

Articulated vehicles may only be utilised to deliver aggregate and fines materials or the distribution/delivery of asphalt product to and/or from the plant during normal business hours, (i.e. between 6.00am to 6.00pm. Monday to Saturday inclusive). The use of articulated vehicles for either the delivery of aggregates and fines or the distribution/delivery of asphalt product to

and/or from the plant outside of normal business hours which includes evening/night/24 hour operations (including emergency works) is prohibited.

Please note that the right of appeal and review of determination provisions of the EP&A Act 1979 that are applicable to Amendment No. 4 are as follows:

Right of Appeal:

In accordance with Section 97AA of the Environmental Planning and Assessment Act 1979, an applicant who is dissatisfied with the determination of a consent authority with respect to the applicant's modification application under section 96 or 96AA (including a determination on a review under section 96AB) may appeal to the Court within 6 months after:

(a) the date on which the applicant received notice, given in accordance with the regulations, of the determination of that application or, if an application for review under section 96AB has been decided, the date on which the applicant received notice, in accordance with the regulations, of the decision, or

(b) the date on which the applicant's application is taken to have been determined in accordance with regulations made under section 82C (3), 96 (6) or 96AA (3).

Review of Determination:

Section 96AB of the Environmental Planning and Assessment Act 1979 gives you, the applicant, the right to request the Council to review the determination of your modification application (made under Sections 96 and 96AA only). This request must be made within the time prescribed by Clause 123I of the EP&A Regulation 2000, being no later than 28 days after the date on which the modification application was determined, and be accompanied by the fee prescribed by Clause 258A of the EP&A Regulation 2000. Review provisions do not apply to:

(a) a determination of an application to modify a complying development certificate,
(b) a determination in respect of designated development,
(c) a determination in respect of integrated development,
(d) a determination made by the council under section 89A in respect of an application by the Crown,
(e) a determination that is taken to have been made because the council has failed to determine an application; and
(f) a determination made by a Joint Regional Planning Panel.

If you have any enquiries in relation to this matter please contact Anthony Peters of Council's Development and Environmental Health Group on 6686 1254.

Yours faithfully

Rod Willis
Group Manager
Development and Environmental Health

16 August 2016

enquiries refer
Anthony Peters
in reply please quote
DA: 1995/127.5

ballina shire council

CONSOLIDATED NOTICE OF DETERMINATION OF A DEVELOPMENT APPLICATION (Amendment No. 4)

Development Application No:	**1995/127**
Applicant:	Bitupave Ltd
Subject Land:	Lot 1 DP 880416, No. 540 Gap Road, Alstonville
Development Proposal:	The replacement of an existing asphalt batching plant with a new higher capacity plant

(NB: Refer to the attached Schedule for a description of all amendments to DA No. 1995/127)

1. This consent is limited to the production of asphalt from aggregate and fines obtained from the adjoining Gap Road Quarry whilst ever the Gap Road Quarry is in operation and the aggregates and fines produced are of a suitable quality and quantity for the production of asphalt. Where the Gap Road Quarry ceases operation and/or the applicant satisfactorily demonstrates to Council that the aggregates and fines being produced at the Gap Road Quarry are not of sufficient quantity or of a suitable quality for the production of asphalt, aggregates and fines are permitted to be obtained from external sources subject to the terms and limitations of the Modification to Amend Consent application submitted to the Council on 9 May 2016, the following additional amendment to Condition 2h and otherwise the retained and applicable conditions of Development Consent 1995/127 (as amended). (**Modified by Amendment No. 4, 10 August 2016**).

2a Activities carried out on the land and road systems pursuant to this consent shall only be undertaken between 6.00 am to 6.00 p.m. Monday to Saturday inclusive (excluding Sundays and public holidays except for emergency work with approval from Council and the DECC); and 24 hour operation for up to 60 days per annum (excluding Sundays and public holidays except for emergency work with approval from Council and the DECC). 24 hour operations are not to be conducted for more than 4 consecutive days at any time. (Modified by Amendment No. 1, 2 March 2005, Amendment No. 2, 30 May 2006 and Amendment No. 3, 27 May 2008).

2b Sunday work and work on public holidays is only to be undertaken where specific approval from both Ballina Council and the DECC has been received by the Company for each event. Applications for Sunday or public holiday work must be made with the

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allocated officer(s) from Council and the DECC and be justified by a case for urgent or emergency work. (Modified by Amendment No. 1, 2 March 2005 and Amendment No. 3, 27 May 2008).

2c Records are to be kept on all operations conducted on Sundays, public holidays or during evenings or nights between 6.00 pm and 7.00 am. These records are to include volumes produced, time of start-up and shut down of the plant, and project destination (including reason for timing). All such records are to be available to Council or the DECC on request and are to be produced each year to demonstrate compliance. (Modified by Amendment No. 1, 2 March 2005 and Amendment No. 3, 27 May 2008).

2d When night or evening work is being undertaken asphalt manufacture is to be stored in hot bins whenever possible. It will be expected that start up of the plant past 10 pm only occur where to not do so, would have a significant or detrimental affect on the works being undertaken. Operation of the loader filling the bins with raw materials should wherever possible be completed during normal working hours or as soon as practicable afterwards. (Modified by Amendment No. 1, 2 March 2005 and Amendment No. 3, 27 May 2008).

2e A clear and legible sign that can be read by members of the public from Gap Road shall be displayed at the front of the plant premises indicating a contact name and/or phone number that can be reached whenever the plant is in operation to permit the community to make inquiries. A suitably experienced officer with the authority to deal with any complaints made shall be able to respond immediately to any such calls. Where plant noise has been exceeded it will be expected that the source be established and the problem rectified at the time if possible. If the noise level is substantially exceeded the plant is to be shut down until satisfactory repairs have been effected. (Modified by Amendment No. 1, 2 March 2005 and Amendment No. 3, 27 May 2008).

2f All drivers engaged on Sundays, public holidays, evenings or night work are to be given formal written instruction to minimise noise when making deliveries and returning to the plant. Such instruction is to be in accordance with the Draft Code of Conduct for Traffic Movement and Site Management Plan dated 3 June 2004 and 25 May 2004 respectively and is to include not using truck exhaust brakes except in an emergency and not to turn on high beam lights when egressing the site. (Modified by Amendment No. 1, 2 March 2005 and Amendment No. 3, 27 May 2008).

2g One way traffic flow through the plant must be adhered to during evening and night operation so that reversing alarms on pick up vehicles are not activated. (Modified by Amendment No. 1, 2 March 2005, Amendment No. 2, 30 May 2006 and Amendment No. 3, 27 May 2008).

2h Articulated vehicles may only be utilised to deliver aggregate and fines materials or the distribution/delivery of asphalt product to and/or from the plant during normal business hours, (i.e. between 6.00am to 6.00pm. Monday to Saturday inclusive). The use of articulated vehicles for either the delivery of aggregates and fines or the distribution/delivery of asphalt product to and/or from the plant outside of normal business hours which includes evening/night/24 hour operations (including emergency works) is prohibited. (Modified by Amendment No. 3, 27 May 2008 and **Amendment No. 4, 10 August 2016**).

3. Development of the site being carried out generally in accordance with the plans and Environmental Impact Statement prepared by *Jim Glazebrook and Associates Pty Ltd* dated 17th December, 1994 and submitted with the development application, subject to such amendment as required by any conditions specified hereinafter.

4. The development shall meet noise emission criteria, standards relating to airborne pollutants and discharge of polluted waters from the site as specified by the Department of Environment and Climate Change NSW. (Modified by Amendment No. 3, 27 May 2008).

5. All necessary licences shall be obtained from the Department of Environment and Climate Change NSW and lodged with Council prior to commencement of work. (Modified by Amendment No. 3, 27 May 2008).

5a The conditions contained within the DECC's Environment Protection Licence issued for the premises under the Protection of the Environment Operations Act are to be complied with at all times. (Modified by Amendment No. 3, 27 May 2008).

6. Sediment control measures shall be put into place and be properly maintained to prevent soil erosion and the transport of sediment off the development site to the requirements and satisfaction of Council's Chief Engineer.

7. The control and management of waste water shall be carried out generally in accordance with the proposed Water Management Plan prepared by Envirotest dated November, 1994 to the requirements and satisfaction of Council's Chief Engineer. This plan and it's management shall incorporate the following features:-

   (a) The containment of stormwater runoff and discarded water from the plant and workshop areas and the prevention of such water entering Branch Creek.

   (b) The provision of vehicle wash down and treatment system prior to overflow to quarry.

   (c) The removal of silt from settling dams to the extent necessary to maintain 90% of wastewater design capacity.

   (d) Stormwater from undisturbed areas shall be diverted around the site.

   (e) Design details of the settlement pond shall be lodged with Council's Engineering Department for approval prior to construction.

8. The implementation of strategies to reduce dust and emissions from the proposed plant to the requirements of Council and the Department of Environment and Climate Change NSW. Such strategies shall include:-

   (a) The recording of details of all complaints by local residents of smell, dust or emissions.

   (b) The implementation of a dust monitoring program in accordance with AS 2724-1.

   (c) The monitoring of exhaust from the hot asphalt loading.

(d) The monitoring of particles from the stack with the installation of a continuous monitoring device.

(e) The construction and operation of the proposed plant to contain dust fallout at below 120-130 mg/m3/day near residential areas.

(f) The reporting of monitoring results and recorded complaints to Council and the Environment Protection Authority every 3 months for the first year of operation and thereafter by arrangement.

(g) The provision of baghouse filter air pollution control of the plant stacks.

(Modified by Amendment No. 3, 27 May 2008).

9. The installation of a 10 metre stack on the mobile plant.

10a If legitimate complaints are received by either Council and/or the DECC about any aspect of the operation (including truck movements external to the site), further noise monitoring/testing will be required to ensure compliance with relevant standards/guidelines. (Modified by Amendment No. 3, 27 May 2008).

10b All acoustic actions and/or controls are to be constantly maintained and/or replaced to ensure compliance with the DECC's Environment Protection Licence conditions. (Modified by Amendment No. 3, 27 May 2008).

10c The negotiated agreement between the company and the owner/occupier of the premises known as 214 Teven Road is to remain in place at all times. Should the agreement cease for any reason, Council and the DECC are to be advised in writing and evening and night works are to cease immediately until a new agreement is in force or the project specific noise level can be compiled with to the satisfaction of Council and the DECC. (Modified by Amendment No. 3, 27 May 2008).

10d If a written agreement cannot be reached and provided to stockpile material on the adjacent Gap Road Quarry site, a suitable stockpiling area on the asphalt plant site must be identified to Council's satisfaction prior to any stockpiling of aggregates and fines. Appropriate surface water, noise and dust controls of the identified area must be implemented to mitigate potential environmental impacts. Evidence of a formal agreement or details of a suitable stockpile location and appropriate controls on the asphalt plant site must be submitted to Council prior to the sourcing of aggregates and fines from alternative sources to the adjacent quarry. **(Modified by Amendment No. 4, 10 August 2016).**

10e Compliance with all the actions proposed in the original development application (dated 25 May 2004), and both noise-monitoring reports, (Heggie dated 12 May 2004, and Hyder, dated 15 October 2004). (Modified by Amendment No. 1, 2 March 2005).

10f Plant noise and in particular that from drive belts on start up is to be monitored by competent staff and belts replaced or tightened as and when necessary to prevent noise from this source. (Modified by Amendment No. 1, 2 March 2005).

10g The fan enclosure is to be fitted with vents (with acoustic control) so that covers do not need to be removed when in operation. (Modified by Amendment No. 1, 2 March 2005).

10h One way traffic flow through the plant must be adhered to during evening and night operation so that reversing alarms on pick up vehicles are not activated. (Modified by Amendment No. 1, 2 March 2005).

11. The existing bund wall along the southern perimeter of lot 3 DP 588893 shall be extended to a height of at least 2.5 metres above natural ground level (145m AHD).

12. A full and detailed landscaping plan shall be submitted to Council detailing types of vegetation and maintenance programs therefore. This plan shall apply principally to the bund walls required by this consent.

13. On-site effluent disposal facilities shall be designed and constructed in accordance with the requirements of Council's Chief Health and Building Surveyor.

14. The Applicant shall widen the sealed pavement of Gap Road from the quarry entrance west to the Teven Road intersection at no cost to Council to the requirements and satisfaction of Council's Chief Engineer. The pavement shall be widened to achieve a 7.0 metre wide seal. This road widening shall be undertaken prior to installation of the mobile batching plant unless other arrangements satisfactory to Council are made.

15. The Applicant shall upgrade the intersection of Gap Road and Teven Road by improving the sight distances to the requirements and satisfaction of Council's Chief Engineer. The required sight distances to be achieved are those for a 60 kph design speed in each road. This upgrading shall be undertaken prior to installation of the mobile batching plant unless other arrangements satisfactory to Council are made.

16. The Applicant shall submit engineering drawings of all roadworks required by this consent to Council for approval prior to the installation of the mobile batching plant.

17. A road maintenance levy of $0.23/tonne of asphalt hauled from the plant shall be paid quarterly to Council. The levy is to be increased annually in accordance with the Consumer Price Index for Sydney, commencing January each year for the life of the plant. Such is to be paid in advance to an amount conforming to 5750 tonnes per quarter.

18. Truck movements to and from the site shall be prohibited from using local village streets as thoroughfares. In particular trucks associated with the use of the plant shall not use Greenie Street, Tanamera Drive and South Street as a transport route to or from the Bruxner Highway.

19. A building application shall be obtained for all proposed buildings.

20. A permit shall be obtained from the Department of Water and Energy for any excavation works within 40 metres from the top of the bank of Branch Creek. (Modified by Amendment No. 3, 27 May 2008).

21. Lighting that faces back toward Alstonville is to be provided with hoods that prevent light spill beyond the Gap Road boundary of the site. (Modified by Amendment No. 1, 2 March 2005 and Amendment No. 3, 27 May 2008).

22. All loads leaving the plant are to be securely covered with a suitable material with the affect of minimising odour as well as loss of product. (Modified by Amendment No. 1, 2 March 2005 and Amendment No. 3, 27 May 2008).

23. The headlight barrier along Gap Road is to be erected to Council's satisfaction prior to the commencement of evening/night works. (Modified by Amendment No. 3, 27 May 2008).

24. The headlight barrier along Gap Road is to be maintained at the full cost of the company and is to be removed by the company at the request of and satisfaction of Council. (Modified by Amendment No. 3, 27 May 2008).

25. Prior to the sourcing of aggregates and fines from proposed sources other than the adjoining Gap Road Quarry, a traffic noise assessment report prepared in accordance with the requirements of Appendix B of the NSW Road Noise Policy must be submitted to and approved by Council. **(Modified by Amendment No. 4, 10 August 2016).**

26. Any aggregates and fines that comprise waste materials generated outside the premises must not be received at the premises for storage, treatment, processing, reprocessing or disposal. This excludes the use of waste materials that meet the definition of Virgin Excavated Natural Material or that are subject to an exemption under Clause 91 of the Protection of the Environment Operations (Waste) Regulation 2014. **(Modified by Amendment No. 4, 10 August 2016).**

The consent as issued on **30 March 1995** shall lapse on **30 March 2000** unless the development has commenced in accordance with the provisions of Section 95 of the Environmental Planning and Assessment Act 1979.

Other Approvals: **The following approval bodies have given general terms of approval in relation to the development:**

NSW Environmental Protection Authority

Note: **The Planning Assessment Commission has not conducted a public hearing in respect of the application.**

Signed: _____ **on 16 August 2016**

Rod Willis
Group Manager
Development and Environmental Health
On behalf of Ballina Shire Council

SCHEDULE OF AMENDMENT APPLICATIONS

Amendment No. 1 – Approved on 2 March 2005

Description of Amendment

To extend the hours of operation for a trial period of 12 months between the hours of 6.00am to 10.00pm Monday to Saturday inclusive. Sunday work or work outside these hours is permitted for no more than 10 days in any one year period.

Amendment No. 2 – Approved on 30 May 2006

Description of Amendment

To extend the limited trial period of 12 months from the previously approved date of 2 March 2006 to 30 June 2006 for no more than three additional days up until and including the 30 June 2006.

Amendment No. 3 – Approved on 27 May 2008

Description of Amendment

To approve the extended hours of operation on an on-going basis and without limitation of the previously approved trial period and administrative changes.

Amendment No. 4 – Approved on 10 August 2016

Description of Amendment

Obtaining/sourcing the aggregates and fines by road from other suppliers (quarries) in the area but only as a contingency should the Gap Road Quarry cease or reduce operations or should the aggregate and fines materials being supplied not be of suitable quality for asphalt production. The asphalt plant was previously limited to obtaining aggregates from the adjoining Gap Road Quarry via previous Condition No. 1.

The potential source(s) or quarries identified in the application were Boral's North Teven Quarry (approximately eight kilometres north-east of the plant – this is the preferred option as it is the closest proximity), Lismore Council's Blakebrook Quarry (approximately 28 kilometres west of the plant) and Boral's West Burleigh Quarry (approximately 81 kilometres north of the plant).

The modification application also originally proposed to delete Condition No. 2h which restricts the use of articulated vehicles at the plant for product deliveries. This has now been deleted from the application by the applicant. This restriction only relates to the use of articulated vehicles during night works to limit noise impacts. The asphalt plant (similar to the quarry) can currently utilise articulated vehicles during the day for the transportation of product. It was, however, considered prudent that Condition No. 2h be further clarified in this regard.

enquiries refer
Anthony Peters
in reply please quote
DA: 1995/276.3 (Amendment No. 2)

ballina shire council

NOTICE TO APPLICANT OF DETERMINATION OF APPLICATION TO AMEND DEVELOPMENT CONSENT
(Issued under Clause 122(1) of the Environmental Planning and Assessment Regulation 2000)

Amendment No.2

Newton Denny Chapelle
PO Box 1138
LISMORE NSW 2480

Being the applicant in respect of an application seeking amendment of Development Consent No. **DA 1995/276** for the following development:

Extractive Industry - Continued operation of hard rock quarry and associated crushing plant, with extraction rates of 100,000 tonnes per annum, with expected incremental increases in extraction rates of 3%-5%, reaching a maximum extraction rate of 150,000 tonnes per annum.

Subject Land

Lot 2 DP 1130300, Cnr Gap Road and Teven Road, Alstonville

Pursuant to Clause 122(1) of the Environmental Planning and Assessment Regulation 2000, notice is hereby given that the application seeking amendment of the subject development consent has been determined by granting **approval** to the modifications specified in this notice.

_____(initial)
Assessment Officer

AMENDED NOTICE TO APPLICANT OF DETERMINATION OF A DEVELOPMENT APPLICATION

Development Application No:	**1995/276**
Applicant:	Newton Denny Chapelle
Subject Land:	Lot 2 DP 1130300, Cnr Gap Road and Teven Road, Alstonville

SCHEDULE OF AMENDMENT APPLICATIONS

Amendment No. 1 – Approved on 28 October 2004

Description of Amendment

To extend the life of the quarry beyond the 10 years specified in the original consent notice including the introduction of revised environmental monitoring and auditing requirements.

Amendment No. 2 – Approved on 13 August 2013

Description of Amendment

To update the blasting methodologies utilised at the quarry to ensure that blasting undertaken is in accordance with contemporary practices and minimises impacts on residential receivers.

To establish timeframes for the next environmental audit for the quarry operations.

DETAILS OF AMENDMENT No. 2

1. To amend Condition No. 20 to read:

   20. ~~The drilling and blasting management plan as recommended by Blastronics Pty Ltd is to be implemented, including monitoring and feedback action to Council, details of which are to be provided in the Environmental Management Plan for the quarry.~~

   20. Blasting occurring on the site is to be undertaken in accordance with the methodologies established in the Orica Quarry Services Report entitled "Blast Impacts Review at Tuckombil Quarry" dated 19 April 2012 and the Blast Design Parameters documented in the Orica Mining Services "Seismic Assessment Report" dated 2 May 2013. Details of these Reports are to be provided in the Environmental Management Plan for the quarry.

2. To amend Condition No 26 to read:

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Assessment Officer

26. ~~An independent Environmental Audit of the quarry operations, the Conditions of Consent, the Environmental Management Plan and the Environmental Protection Licence is to be undertaken every three (3) years, for the duration of the life of the quarry. Each Environmental Audit is to be submitted to and approved by the Manager of the Regulatory Services Group. Should the findings of the audit recommend the Environmental Management Plan be revised, such is to occur to the satisfaction of Council's Regulatory Services Group Manager, within 6 months of each audit.~~

26. An independent Environmental Audit of the quarry operations, the Conditions of Consent, the Environmental Management Plan and the Environmental Protection Licence is to be undertaken every three (3) years, for the duration of the life of the quarry. Each Environmental Audit is to be submitted to and approved by the Manager of the Development and Environmental Health Services Group. Should the findings of the audit recommend the Environmental Management Plan be revised, such is to occur to the satisfaction of Council's Development and Environmental Health Services Group Manager, within 6 months of each audit.

    The next Audit will be due not less than 2 months after the first blast undertaken in accordance with the methodologies and parameters documented in Orica Quarry Services Report.

3. To amend Condition No's. 25, 26 and 27 by replacing references to the Regulatory Services Group with the Development and Environmental Health Group.

Development Proposal:

Extractive Industry - Continued operation of hard rock quarry and associated crushing plant, with extraction rates of 100,000 tonnes per annum, with expected incremental increases in extraction rates of 3%-5%, reaching a maximum extraction rate of 150,000 tonnes per annum.

GENERAL CONDITIONS

General

1. Development of the site being carried out generally in accordance with the environmental impact statement prepared by J Glazebrook and Assoc Pty Ltd, dated 25th May 1995 (including supplementary advisings) and submitted with thedevelopment application subject to such amendment as required by any condition specified hereinafter.

2. A detailed Plan of Management for the operation of the quarry is to be prepared to the requirements and satisfaction of Council. Such plan is to be submitted to Council within six (6) months from the date of this notice. The Plan shall be generally in accordance with Section 7 .11 of the EIS and shall report on all operational parameters of the quarry including, but not limited to, quarry development and staging and monitoring thereof, progressive rehabilitation, erosion and sediment control, control of pollutants and surface water effects. This Plan shall detail the full ten (10) year life of the quarry with a total resource of 1.3 million tonnes, however this Plan and quarry operation generally will be re-appraised by Council five (5) years after this

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Assessment Officer

consent has become effective to ensure that there are no unforseen environmental impacts or problems with the development.

3. A road maintenance levy of $0.23/tonne hauled shall be paid quarterly to Council. The levy is to be increased annually in accordance with the Consumer Price Index for Sydney, commencing January 1996 for the life of the extraction.

4. Standard hinged "Tucks Entering" warning signs are to be erected either side of the quarry access and are to be displayed during operations.

5. The pavement of Teven Road south of Gap Road shall be improved to a minimum seven (7) metre wide sealed carriageway for the reason of reducing noise and improving safety.

6. In conjunction with Boral Asphalt (refer to conditions 14 and 15 of Development Consent No. 1995/127) the applicant shall upgrade the Teven Road/Gap Road intersection to an AUSTROADS Type B treatment, and widen the pavement of Gap Road adjacent to the access to permit southbound traffic to avoid entering trucks. Also in conjunction with Boral Asphalt, the pavement of Gap Road from the quarry access to Teven Road shall be widened to a seven (7) metre wide sealed carriageway.

7. Trade waste and general storage areas and access thereto shall be provided to the requirements and satisfaction of Council's Engineer and Health and Building Surveyor.

8. Effective erosion and sediment control measures are to be adopted to the satisfaction of Council's Engineer and to the requirements of the Soil Conservation Service (CALM) and the Environment Protection Authority. Details of such measures are to be provided in the Environmental Management Plan.

9. This consent enables the total extraction of 450,000m3 (1.3 million tonnes). This approval is contingent upon satisfactory re-appraisal of the Environmental Management Plan at the five (5) year period. **(As amended by Amendment No. 1, 28 October 2004)**

10. All loading and unloading is to take place wholly within the confines of the quarry site.

11. Vehicles using off-street loading/unloading and parking areas must enter and leave the site in a forward direction, and all driveways and internal road are to be kept clear of all obstructions that would prevent compliance with this condition.

12. General quarry operations are to be restricted to the hours of 7.00am to 5.00pm Monday to Friday and 7.00am to 3.00pm Saturday.

13. The sequence of operations in each stage of the quarry development shall take place only in accordance with the approved Environmental Management Plan.

14. The annual rate of extraction shall take place in accordance with Table 2 (Section 3.4.3) of the EIS. Prior formal development consent is to be obtained from Council for any proposed extraction in excess of this amount.

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Assessment Officer

15. The quarry operator shall not knowlingly destroy, deface or damage any aboriginal relic or other item of archaeological significance within the extraction area without the prior written consent of the National Parks and Wildlife Service of NSW.

16. Upon discovery of any aboriginal relics within the meaning of the National Parks and Wildlife Act, 1974 as amended, within the quarry, the operator shall immediately notify the National Parks and Wildlife Service and the Jali Local Aboriginal Land Council and shall cease operations within the vicinity thereof until such time as the consent of the NP&WS is obtained for the destruction, removal or protection thereof and the quarry operator has complied with the directions of the Service in that respect.

17. A full and detailed landscaping plan is to be prepared (and included as part of the Plan of Management) detailing the types of vegetation and maintenance programs therefore, in accordance with the Rehabilitation Program (constituting Appendix 3) of the Flora and Fauna Assessment undertaken by J Warren, Biological and Environmental Consultant, and contained in Appendix B of the Environmental Impact Statement.

18. The fuel tank, waste oil drums and shed situated within the quarry and utilised by Council's Parks and Gardens Department is to be bunded so as to contain any possible spillages/leaks to the requirements and satisfaction of Council's Health and Building Surveyor.

19. An emergency and fire control plan is to be prepared and implemented and details of which are to be provided in the Environmental Management Plan for the quarry. Such plan is to include spill control and fire prevention.

20. Blasting occurring on the site is to be undertaken in accordance with the methodologies established in the Orica Quarry Services Report entitled "Blast Impacts Review at Tuckombil Quarry" dated 19 April 2012 and the Blast Design Parameters documented in the Orica Mining Services "Seismic Assessment Report" dated 2 May 2013. Details of these Reports are to be provided in the Environmental Management Plan for the quarry. ***(As amended by Amendment No. 2, 13 August 2013)***

21. Suitable bunding is to provided to contain minor spills of fuel and engine oils during refuelling/servicing and any ground contamination is to be cleaned up to the requirements and satisfaction of Council's Health and Building Surveyor. Contingency plans for such occurrences are to be detailed in the Environmental Management Plan for the quarry.

22. Dust monitoring is to be undertaken to determine the effectiveness of existing control measures and to evaluate new control measures. Dust deposition gauges (per AS 2724-1) are to be provided. Details of such monitoring are to be provided in the Environmental Management Plan for the quarry.

23. The earthen bund wall is to be extended along the southern perimeter of lot 3 in DP 588893 Teven Road to a height at least 2.5m above the natural ground level (approximately to a ground contour level of 145m).

24. Compliance with the requirements of the Environment Protection Authority in relation to noise, water and air discharges and the obtaining of the relevant licences.

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Assessment Officer

25. A revised Environmental Management Plan is to be prepared to the satisfaction of Council's Development and Environmental Health Group Manager, within three (3) months of the date of this approval. The revised Environmental Management Plan is to reflect current site operating conditions and current legislation requirements. ***(As inserted by Amendment No. 1, 28 October 2004 and as Amended by Amendment No. 2, 13 August 2013)***

26. An Independent Environmental Audit of the quarry operations, the Conditions of Consent, the Environmental Management Plan and the Environmental Protection Licence is to be undertaken every three (3) years, for the duration of the life of the quarry. Each Environmental Audit is to be submitted to and approved by the Manager of the Development and Environmental Health Group. Should the findings of the audit recommend the Environmental Management Plan be revised, such is to occur to the satisfaction of Council's Development and Environmental Health Group Manager, within 6 Months of each audit.

    The next Audit will be due not less than 2 months after the first blast undertaken in accordance with the methodologies and parameters documented in Orica Quarry Services Report. ***(As inserted by Amendment No. 1, 28 October 2004 and as Amended by Amendment No. 2, 13 August 2013)***

27. An annual fee of $1000 is to be paid to the Development and Environmental Health Group for the purposes of ensuring compliance with the Conditions of Consent. This figure is to be adjusted annually in accordance with CPI. ***(As inserted by Amendment No. 1, 28 October 2004 and as Amended by Amendment No. 2, 13 August 2013)***

28. Two (2) copies of the Environmental Management Plan are to be located at the Quarry Office and one (1) copy a Council's Administrative Centre. Copies are also to be provided and retained by all contractors regularly engaged to carry out significant operations on the site. Contractors are to provide Council's quarry manager with written acknowledgement that they have received and understand the Environmental Management Plan in so far as it applies to their involvement on the site. ***(As inserted by Amendment No. 1, 28 October 2004)***

_____(initial)
Assessment Officer

The consent shall lapse on **11 September 2000** unless the development has commenced in accordance with the provisions of section 95 of the Act.

Right of Appeal:

In accordance with Section 97AA of the Environmental Planning and Assessment Act 1979, an applicant who is dissatisfied with the determination of a consent authority with respect to the applicant's modification application under section 96 or 96AA (including a determination on a review under section 96AB) may appeal to the Court within 6 months after:

(a) the date on which the applicant received notice, given in accordance with the regulations, of the determination of that application or, if an application for review under section 96AB has been decided, the date on which the applicant received notice, in accordance with the regulations, of the decision, or

(b) the date on which the applicant's application is taken to have been determined in accordance with regulations made under section 82C (3), 96 (6) or 96AA (3).

Review of Determination:

Section 96AB of the Environmental Planning and Assessment Act 1979 gives you, the applicant, the right to request the Council to review the determination of your modification application (made under Sections 96 and 96AA only). This request must be made within the time prescribed by Clause 123I of the EP&A Regulation 2000, being within 28 days of being notified of Council's decision, and be accompanied by the fee prescribed by Clause 258A of the EP&A Regulation 2000. Review provisions do not apply to:

(a) a determination of an application to modify a complying development certificate,
(b) a determination in respect of designated development,
(c) a determination in respect of integrated development,
(d) a determination made by the council under section 89A in respect of an application by the Crown,
(e) a determination that is taken to have been made because the council has failed to determine an application; and
(f) a determination made by a Joint Regional Planning Panel.

Rod Willis
Group Manager
Development and Environmental Health Group

Dated 13 August 2013

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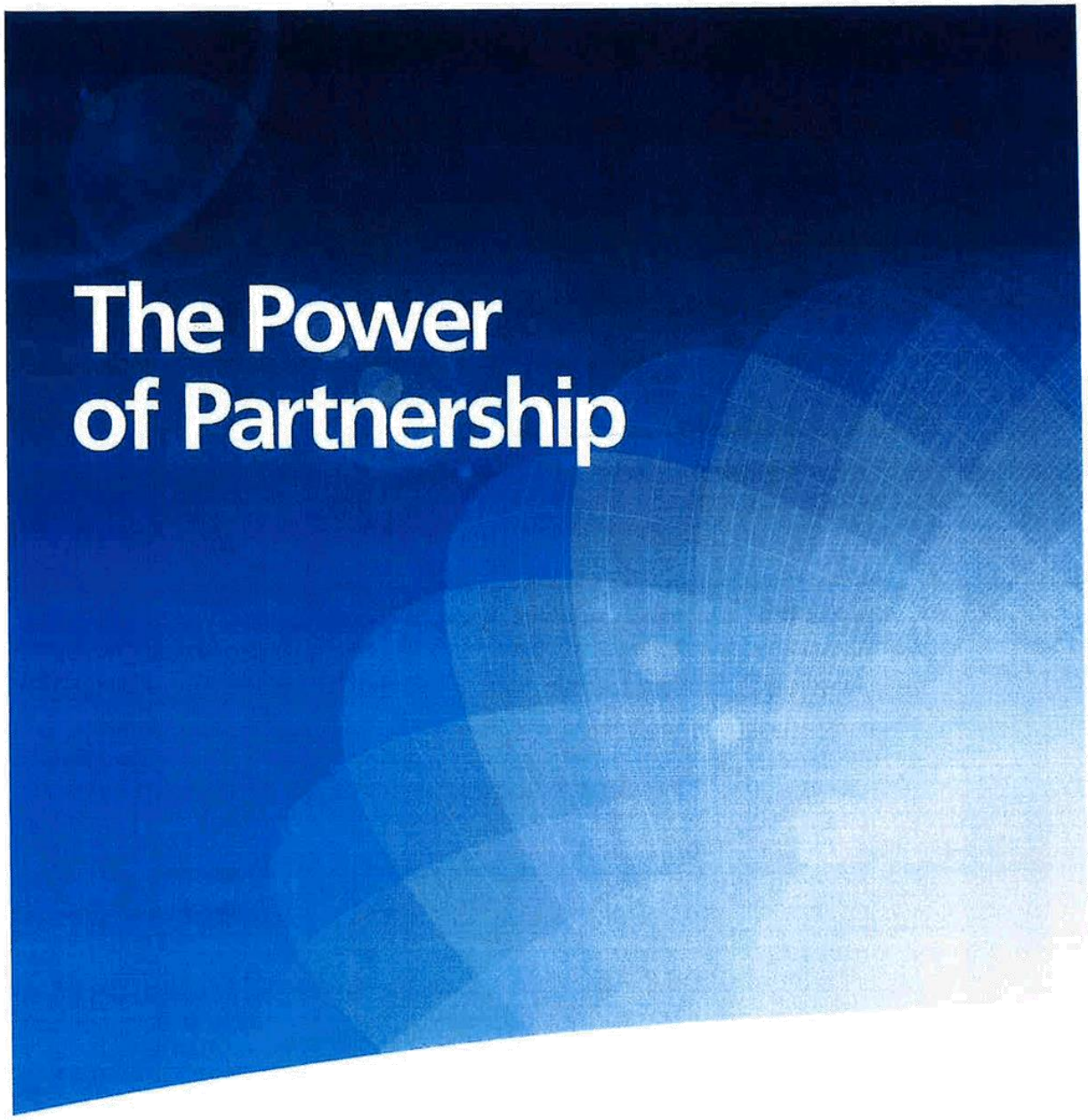
Assessment Officer

B Quarry Blast Report



Seismic Assessment Report

Lismore Shire Council – Tuckombil Quarry

Date: 2nd May 2013
Author: Dwayne Walsh
Blasting Technician
Orica Australia
Phone: 0402 782 986
Email: dwayne.walsh@orica.com

ORICA MINING SERVICES

Contents

1 Introduction

Lismore Shire Council engaged Orica Quarry Services to conduct a seismic assessment for the Tuckombil Quarry at Alstonville, New South Wales.

The seismic assessment involved firing a series of small explosive charges along the edge of the proposed extraction limit and monitoring the resultant vibration at the nearest sensitive receiver. The nearest sensitive receiver is a residential development bordering the site, and monitoring the vibration at strategic locations in the vicinity of this development can determine site vibration transmission characteristics and ultimately, maximum charge weights to allow the development of a Site Law.

This information is critical to generating an accurate understanding of the blasting parameters required to comply with the sites environmental licence limits for blast induced vibration.

According to the sites' Licence Conditions the environmental limit for ground vibration is 5 mm/s for 95% of blast events, with a maximum of 10 mm/s and the air overpressure limit is 115 dBL for 95% of blast events, with a maximum limit of 120 dBL.

This report details the process of conducting the seismic assessment, the analysis of the results and the resultant Site Law for the site. It also provides recommendations regarding the impact of blasting operations upon residential dwellings in the associated neighbouring development.

2 Tuckombil Quarry

The Tuckombil Quarry is located at the corner of Gap and Teven Roads near the town of Alstonville, Northern New South Wales. There are residential developments nearby with a high concentration of residential housing to the south and west of the quarry location. To the north and east of the quarry there is a scattering of nurseries and rural land associated with farming activities. The closest residence is located to the west of the quarry on Teven Road. The distance to this property is approximately 200m from the edge of the current extraction zone.

The quarry has been subdivided to provide areas for 2 other business entities to operate. An area in the north west of the quarry site is utilized by Ron Southon Pty Ltd as a Depot and Explosives Storage Facility. Boral operates an asphalt plant in the south of the site, near the entry and exit point of the quarry. These operations are classified as part of the quarry operation, and for the purposes of this study were not deemed "sensitive receptors".

Figure 1: An overview of the quarry location with respect to surrounding neighbours.

3 Blast Monitoring Locations

For each blast event on site blast monitors should be placed at 4 sites surrounding the quarry to capture vibration and overpressure data. The nearest sensitive receiver is the residence on Teven Road. The monitor located at this property is known as Monitor #01. Monitor #02 is located at the rear boundary of residences on Tanamera Road. Similarly, Monitor #03 is located at the rear boundary of residences on Granada Road and Monitor #04 is located at the nearest residence to the east of the quarry on Gap Road.

The residence at Monitor #01 is in particularly close proximity to the quarry and historically has had higher environmental readings as a result of blasting events. Therefore, the main focus of the seismic assessment is to determine appropriate methods for the control of blast induced ground vibrations at this location.

In previous reports on blasting at Tuckombil, the residence at Monitor #01 may have been referred to as the "Schmidt Residence".

Figure 2: An overview of the quarry location with respect to blast monitor locations.

4 Seismic Assessment

The primary factors which influence the magnitude of ground vibration produced from blasting include:

- The maximum quantity of explosive fired at any one time, known as the Maximum Instantaneous Charge (MIC);
- The distance between the blast holes and the point of measurement;
- The local geological conditions.
- Delay interval between charges firing.
- Direction of initiation.

By firing a series of charges across the site and measuring the vibration response at strategic locations, a Scaled Distance relationship between explosive charge weight and vibration can be created. This relationship can then be used to assist with blast design's that remain below the agreed site vibration limits.

4.1 Seismic Assessment Design

The seismic assessment involved the charging and firing of 5 test holes in a row spaced along the length of the perimeter of the extraction area closest to Monitor #01. Each of the 5 test holes were loaded with a single explosive charge and filled to the collar with stemming material to ensure no flyrock or stemming ejection would be experienced.

Seven vibration monitors were established at the residence and at strategic locations between the test holes and the residence.

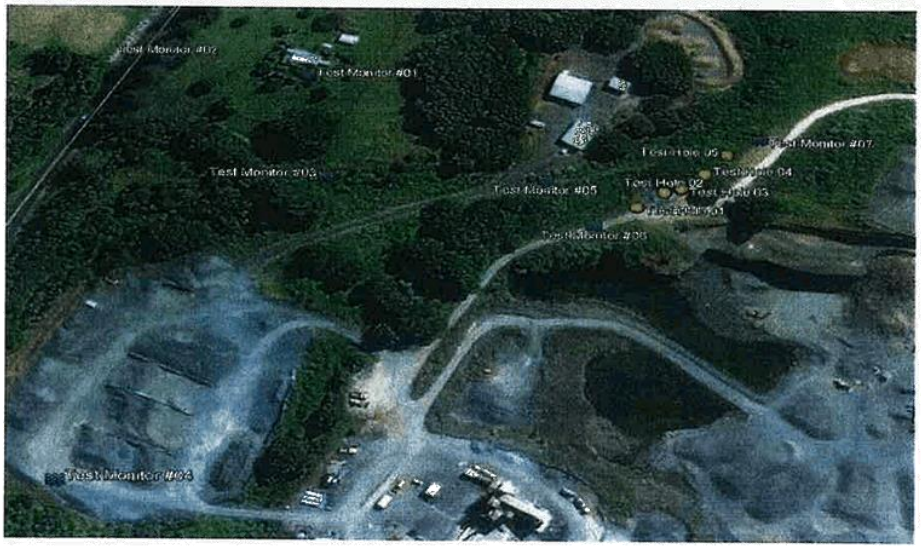


Figure 3: Seismic Assessment – Test Holes and Monitor Layout

4.2 Vibration Measurement

A total of 7 blast monitors were used, located at a distance ranging from 20 metres through to 363 metres from the test holes. The peak particle velocity (ppV) from each charge was measured by installing a tri-axial geophone at each monitoring location. In accordance with the Australian Standards AS2187, the units were coupled to the ground via a buried concrete block. All reported vibration levels are the peak vector sum value of the three orthogonal components of vibration.

The specific location of each test hole and monitor location was determined by using a GPS unit and overlaid on an aerial picture of this site. All distances used in this seismic assessment analysis were calculated on the basis of these measured coordinates.

The monitoring locations were concentrated to the west of the blast area as this was the direction in which the sensitive receiver (residence) of concern is located.

4.3 Seismic Assessment Results

A site vibration law is calculated using the data collected from the seismic assessment including the distance from each monitor to each test hole and the monitor readings from each test hole firing. Using the data collated, a regression analysis is used to calculate a 50% confidence (average mean) and a 95% vibration prediction confidence.

The site law is calculated using the following formula:

$$ppV = K(S.D.)^{-n}$$

Where: ppV = the peak particle velocity measured in mm/s

K = Site-specific constant

n = Site-specific Constant

The seismic assessment is used to determine the value of these site constants. It is important to use site specific constants as only then is the estimated vibration calculated relevant to the specific site.

To calculate the Scaled Distance the following formula is used:

$$\text{S.D.(ScaledDistance)} = \frac{D}{\sqrt{W}}$$

Where: D = Distance between the blast and the monitor (m)

W = Maximum Instantaneous Charge (kg)

4.4 All Monitoring Data Combined

Using the vibration measurements collected from the 7 monitors and 5 blast holes (35 data points), a site-specific relationship between the level of vibration (ppV), the quantity of explosive (MIC) and the distance from the blast was derived.

However, a review of the data recorded identified that results from 2 of the monitors, #02 and # 04 did not correlate with the data from the other 5 monitors and as such were removed from the calculation.

It is not uncommon to have some anomalous data when doing a seismic assessment. This can be caused by localized geological issues at the monitor location that is highlighted during the assessment process as being inconsistent with the overall footprint of the quarry and its surrounding region.

4.5 Regression Analysis

As stated in section 4.3, a regression analysis is used to calculate a 50% confidence (average mean) and a 95% confidence level for predicting vibration levels at any given distance.

The information from the 5 monitors combined with the 5 charges provided 25 data points for a regression analysis. A plot of this data is illustrated in Figure 4.

The values on the Y axis indicate the measured vibration level (ppV). The values on the X axis represent the value of the scaled distance (distance scaled by the charge weight, as per equation above).

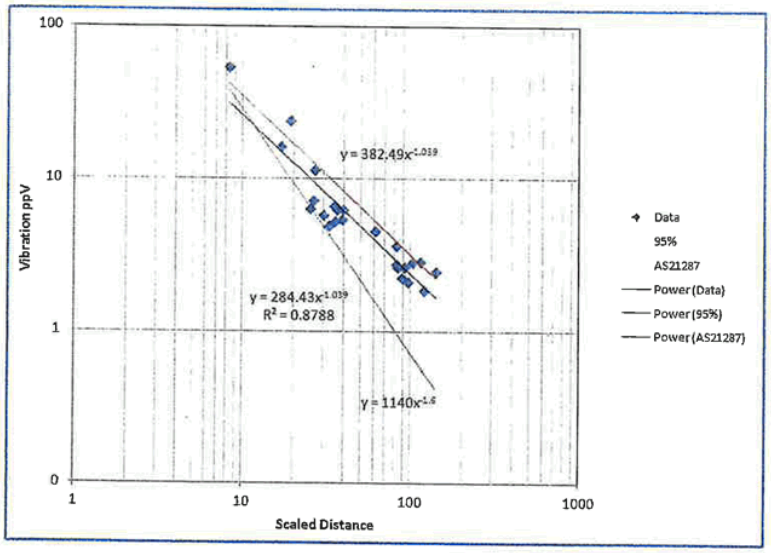


Figure 4: Graph of Scaled Distance vs. ppV for Southern Monitoring Points

The equation for the 50% confidence level (black line) is as follows:

$$ppV = 284(S.D.)^{-1.04}$$

However, it is considered best practice to use a 95% confidence level as legislative requirements usually stipulate 95% of blasts to be below the required limit. The equation for the 95% confidence level (red line) determined by the analysis is as follows:

$$ppV = 382(S.D.)^{-1.04}$$

4.6 Site Law (Charge Weight Impact on Vibration)

The maximum quantity of explosive firing for a given interval (MIC) has a direct affect on the level of vibration produced by blasting. Using the site specific equations given above, the minimum distance required to comply with the imposed vibration limits at the nearest residences can be estimated for differing charge weights (MIC's). This is illustrated in Table 1 for a limit of 5mm/s.

Distance (m)	MIC (kg)
200	9
225	11
250	14
275	17
300	19
325	23
350	27
375	31
400	35
425	40
450	45
475	50
500	55

Table 1: Allowable Charge Weights

5 Air Overpressure

Air overpressure is the air-borne pressure pulse which occurs from blasting as a result of bulk movement of a blast face or venting of explosive gases to the atmosphere. The latter usually occurs as a result of inadequate confinement of the explosive charge while the former is a function of the size of the blast face and firing direction. Unlike ground vibration, the level of air overpressure is influenced by both topography and prevailing weather conditions.

It is recommended that industry standard measures of face profiling and boretracking front row holes are used to control overpressure and flyrock issues.

The seismic assessment utilised small charges which were heavily confined resulting in zero ground movement. As such, air overpressure modelling was not a part of the Blast Evaluation program.

6 Recommendations

As a result of the seismic assessment a Site Law has been generated along with a table detailing MIC in relation to distance from the monitoring location.

These should be utilised to determine appropriate design and loading for future blast events in order to ensure compliance with licence conditions for vibration with particular respect to Monitor #1.

As further blasting takes place on site, the monitor data will be gathered and will be combined with the data gathered from this assessment to further refine the Site Law and Charge Weights table ensuring that the vibration prediction is as accurate as possible for the site.

In cases where the recommended MIC is quite low i.e. in the vicinity of 35kg and below, it may be necessary for shots to be decked. It is recommended that where possible bench heights are able to be amended to ensure there are no more than 2 decks in any one hole. This will reduce the complexity of the design as well as the chance for error in both loading and timing which has a direct influence on associated blast delays.

In all cases it is imperative to ensure that each prediction assesses other influences on the blasting event on site including boretraking results, survey data including face profiling, and changes in direction of firing and timing regime amongst others.

Orica also recommends the implementation of the Unitronic electronic blasting system on site. The programmability of the electronic detonator allows the blast to be designed to achieve single deck/single hole, low MIC firing which is critical to meeting vibration limits at Monitor #1. There are also a number of other benefits of electronic blasting systems which can be discussed with a Technical Services Representative.

Tuckombil Blast Parameter Guidelines

	Distance From Sensitive Receiver							
	200m	225m	250m	275m	300m	350m	400m	450m
Bench Height	9m	10m	11m	12m	13m	15m	10m	12m
Hole Diameter	76mm	76mm	76mm	76mm	76mm	76mm	76mm	76mm
Burden	2.0m	2.1m	2.1m	2.2m	2.2m	2.3m	2.3m	2.4m
Spacing	2.0m	2.1m	2.2m	2.3m	2.4m	2.5m	2.3m	2.6m
MIC	9kg	11kg	14kg	17kg	19kg	27kg	35kg	45kg
Decks	2	2	2	2	2	2	1	1
Number of Blastholes	100	100	100	100	100	100	130	130
BCM (yield)	3600m³	4410m³	5082m³	6072m³	6864m³	8625m³	7475m³	7488m³

Table 2: Recommended blast parameters.

7 Summary

Orica Quarry Services conducted a seismic assessment on site at Tuckombil Quarry in Northern New South Wales in order to determine an appropriate Site Law for achieving site licence limits for blast induced vibration at the nearest sensitive receivers on site.

The assessment determined that blasting in close proximity to the nearest sensitive receiver known as Monitor #1 is achievable. However, a number of recommendations have been given in order to ensure that this can occur.

- Future blast monitoring data is gathered and added to this seismic assessment to further refine the site law
- Limit blast charging to 2 decks in any one hole. This may involve limiting bench heights in some areas
- Implementation of the Unitronic Electronic Blasting System to enable single hole/single deck firing critical to meeting vibration limits
- Ensure all this information is used in conjunction with other influences on the blasting event such as boretrak results, survey information, and weather events.

The Power of Partnership

Blasting Impacts Review at Tuckombil Quarry

Report for Newton Denny Chapelle and Lismore City Council

Blastronics report dated May 1995 Appended

Date: 20th August 2012

Author: Nathan Hammond
Technical Services Engineer
Orica Quarry Services

ORICA MINING SERVICES

Contents

1. Executive Summary

- Blasting methods recommended in the 1995 Blastronics report to manage blast induced vibrations and airblast do not reflect recent technological advances in blasting techniques.
- Recent blasts fired at the quarry have not conformed to parameters suggested in the Blastronics report, and are likely to have generated elevated levels of blast vibrations and airblast experienced by nearby residences as a result.
- Adoption of more contemporary blasting techniques will significantly reduce blast nuisances to nearby neighbours, and allow resultant blast vibration and airblast to conform with current Australian Standard human comfort limits, and those recommended in the original Blastronics report.

2. Introduction

Orica quarry services and their technical services division have been engaged by Newton Denny Chapelle to review existing blasting parameters at the Tuckombil Quarry located near the town of Alstonville in Northern NSW. This review document will provide recommendations to update current blasting parameters following developments and advances within the blasting industry. This document follows on from an investigation completed by Blastronics in 1995 on the blasting impacts at the Tuckombil Quarry, a report from which was submitted as part of an EIS being undertaken at the site during that time.

The Blastronics report involved a detailed investigation into the ground vibration propagation characteristics of the quarry site, and made recommendations for blasting parameters to ensure compliance with noise and ground vibration comfort limits for nearby residences. The blast parameters recommended in the Blastronics report were based on accepted products and techniques of the day. These products and techniques have since been superseded through technological advances and improved understanding of the mechanics of blast vibrations transmitting through the ground and air. This report will build on the information provided in the Blastronics report and recommend contemporary blast practices and parameters to ensure best blasting methods are used to minimise blasting impacts and disturbances to nearby neighbours.

The Blastronics report is appended to this report for further reference.

3. Quarry Location and Neighbouring Properties

The Tuckombil Quarry is located at the corner of Gap and Teven Roads near the Town of Alstonville Northern NSW. There are residential developments with a high concentration of residential housing to the south and to the west of the quarry location. To the north and east of the quarry there is a scattering of nurseries and land associated with farming activities. The closest residence is located directly west of the future development area of the quarry, on Teven Road. Distance to this property is approximately 200m.

The quarry site has been subdivided to provide areas for 2 other business entities to operate. An area in the north west of the quarry site, Lot 3 DP1130300 is utilized by Ron Southon Pty Ltd as a Depot and Explosives Storage Facility. Boral operates an Asphalt plant in the south of the quarry site in Lot 1 DP880416, near the entry and exit point of the quarry.

Figure 1: An overview of the Quarry location with respect to surrounding neighbours.

Figure 2: Showing Quarry site and 2 associated businesses located within the Quarry site – Ron Southon Pty Ltd and Boral Asphalt.

Future extraction operations will concentrate on an area in the north of the quarry site, adjacent to the Ron Southon depot and explosives magazines. The minimum distance of blasting and excavation operations in the future extraction area to the Ron Southon Depot is approximately 75m.

The next closest entity is the residence on Teven Road to the west of the of the future extraction area. The minimum distance of blasting and excavation operations to this residence is approximately 200m. When referencing the 1995 Blastronics report, this residence is believed to be referred to as the "Schmidt Residence". For continuity purposes this report will also refer to this residence as the "Schmidt Residence", although this may not reflect the name of the current residents in the dwelling.

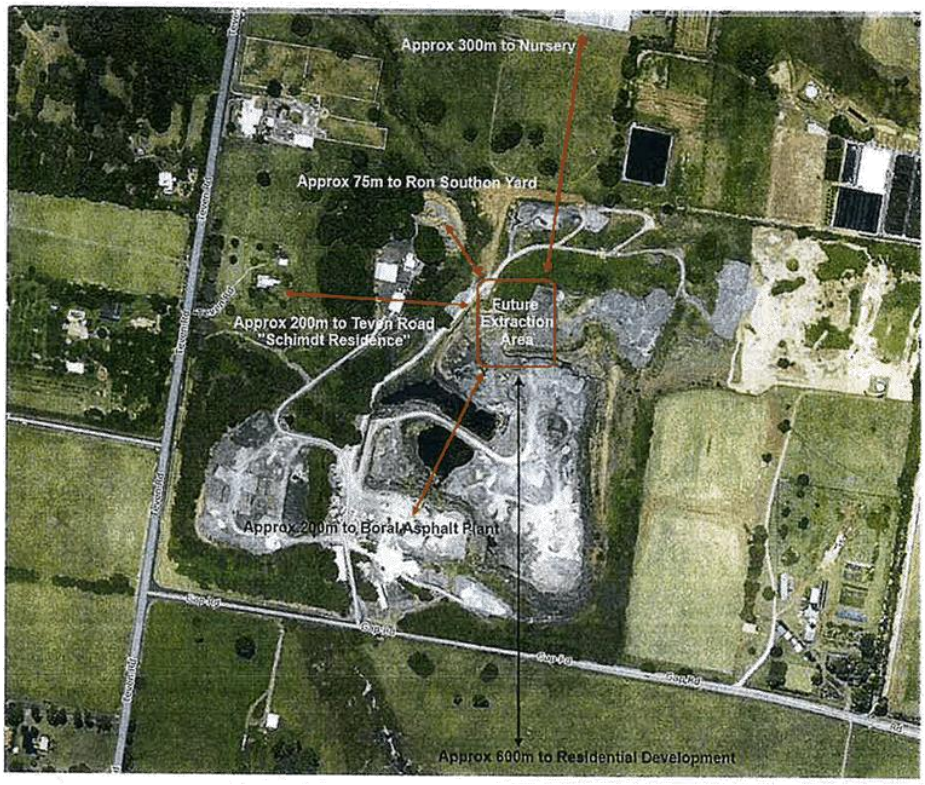


Figure 3: An overview of the future extraction area to highlight its position and the proximity of nearby commercial and residential buildings/infrastructure. Note : The indicated extraction area is not representative of the size of the future extraction area, and merely provides an indication of its location.

4. Blastronics May 1995 Report Overview

The Blastronics report dated May 1995 involved a detailed program of test blasting to develop a sound understanding of the ground vibration characteristics of the site, and hence would enable blasting contractors to be able to accurately predict vibration levels experienced at specific distances from a given charge (explosive load) being detonated underground.

The method of generating a "Seed Wave" model used in the Blastronics investigation is still utilised in the blasting industry today to determine the vibration characteristics at a given blast site. Although this is an involved process, it is the only way to produce an accurate vibration prediction model for the site. Other generic models or equations will not provide acceptable accuracy for close proximity neighbours, given the number of geological parameters that affect vibration propagation within a rock mass.

It should be noted that the actual data obtained from the Blastronics seed wave modeling is no longer available for review. The resultant blasthole charge restrictions returned by the blast modeling process appear to be very restrictive in comparison to other quarries with similar geology and close proximity neighbours. If the quarry operator intends on intensifying extraction operations and volumes above existing levels, it is recommended that another seed wave modeling process be conducted to firm up the results reported on in the Blastronics report.

Airblast prediction modeling, and airblast control measures included in the Blastronics report are not so effectively resolved. There are a number of airblast control measures that are currently utilised within the industry today that were not addressed in the Blastronics report, as they were not understood at the time of the report. As such the report makes some unnecessary blast design recommendations that are operationally restrictive in todays market.

The Blastronics investigation provided a variety of blast design parameters for four difference zones in the quarry (Zone A – D) at varying distances to nearest sensitive residences, and reflected the different areas that could be blasted in the quarry. The design parameters for these zones were calculated to ensure compliance with ground vibration and airblast comfort levels produced by blasting, as per the NSW EPA limits at that time.

The blasting parameters, products, and methodologies used at the time of the investigations, and also recommended in the report, are considered outdated in the drill and blast marketplace today. These products and methods are seldom used in contemporary blasting near sensitive neighbouring residences or structures.

5. Recent Blasting Techniques used at Tuckombil Quarry

On review of 4 Blast Summary Records made available from the previous drilling and blasting contractor at the Tuckombil quarry, it is apparent that the contractor was not following the design parameter recommendations set out in the Blastronics report. Secondly, blast designs did not utilise any contemporary methods to reduce blast induced ground vibration or airblast. Subsequently the impact to nearby neighbours would have been much greater than would have been resultant from following the Blastronics parameters.

Monitoring equipment utilised by the previous contractor appears to have been located on Gap Road and on one occasion at Greenie Drive, both approximately 400m from blasting activities. Monitoring at either of these locations would not have addressed the correct practice of monitoring at the "most affected residence". The most affected residence would have been the property approximately 200m from blasting operations, the "Schmidt Residence" on Teven Road. It is unlikely given the ground and air vibration levels recorded 400m away, that Australian Standard recommended comfort levels of airblast or vibration would have been achieved at the Shimdt Residence using the contractors blasting techniques.

Upon adoption of more advanced blast vibration and airblast management techniques recommended in this report, nearby residents will experience significantly less impact from blasting activities than they have been used to. A secondary consequence is that quarry operators will likely experience a negative impact on blast fragmentation, as is often the case when blasting to maintain environmental considerations.

6. Contemporary Blasting Techniques

6.1 Changes to Blasting products

The Blastronics report blast parameters were based on using ANFO (Ammonium Nitrate Fuel Oil) and packaged explosives as the main explosives for blasting, whilst utilising non-electric initiating explosives to achieve blasthole initiation sequencing.

Current best practice blasting methods use bulk emulsion based or water-gel based blasting agents pumped into the blastholes via a Mobile Manufacturing Unit based on a truck platform. Electronic detonators with internal circuit boards are used to more accurately sequence the firing of blast holes within a blast, and allow more flexibility with blast designs through the use of programmable firing times.

Figure 4 – Blasthole loading at a quarry with a Mobile Manufacturing Unit (MMU). The MMU can accurately measure and deliver the required designed amount and type of explosives into each blasthole.

6.2 Changes to Blasting Methods

The Blastronics report suggested parameters based on number of blast holes and blasthole charges for a given blast pattern to effectively manage the blast vibration to within the levels recommended following the seed wave modelling.

With the advent of electronic detonators, multiple decks of explosive charges can be fired at different delays, allowing full height bench blasts (as per Zone A in Blastronics report) to be fired, whilst still effectively manage environmental constraints through the appropriate use of blast charge timing and sequencing. Airblast levels can be effectively managed through this same process, along with accurate measurement and control of front row blasthole burdens which was unachievable at the time of the blastronics report.

Figure 5 – Shotfirer firing a blast using electronically programmed detonators to ensure vibration and airblast effects from blast are reduced as much as possible.

7. Common Concerns from Neighbours

As this document's intent is to recommend advanced blasting parameters to reduce the impacts of blasting operations on nearby residential and commercial properties, it is relevant to address common neighbour concerns with blasting operations and highlight modern control measures that Orica recommends using which address such concerns.

7.1 Rock Ejection / Flyrock

Close proximity neighbours are often concerned with rocks uncontrollably being thrown by the blast into their property or in the vicinity of their property from blasting operations.

Flyrock can be effectively managed through careful control of front row burdens and blasthole loading quantities. Less advanced drill and blasting techniques rely on designing front row blastholes and burdens by eye, or the fishing pole method, and utilising offset charts to calculate where an angled blasthole should end up at the bottom of the hole. Unfortunately this method cannot take into account blasthole deviation that often occurs (to a varying degree) due to the rockmass geology. Essentially a blast designer using this method believes a hole is positioned at a certain location within the blast. In reality, blasthole deviation or drilling error has resulted in this hole being in a different spot – potentially a cause of flyrock due to localized overloading or overly light front burdens.

Advanced techniques recommended by Orica to address this involve completing a 3D laser scan of the blast face to give an accurate measurement of the blast face. Figure 6 gives an example of a scanned blast face. Accurate measurements of the blast face means that front row blast holes can be designed to be positioned at precise locations behind the blast face to ensure that there is sufficient burden to prevent a flyrock event. Figure 8 Shows the positioning of front row holes behind the blast face.

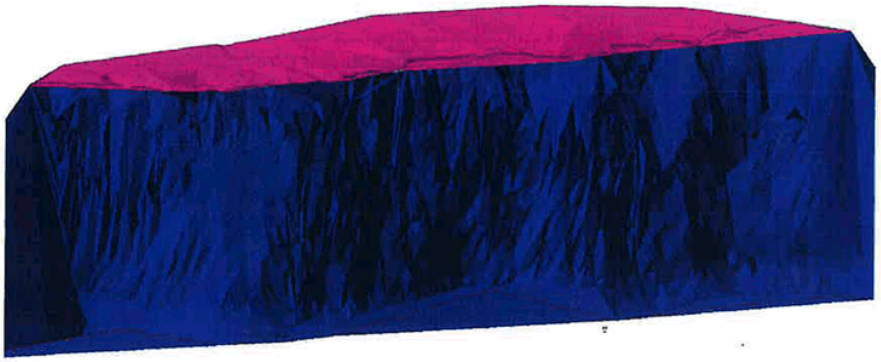


Figure 6 – Shows a scanned surface of a blast face generated using laser scanning technology.

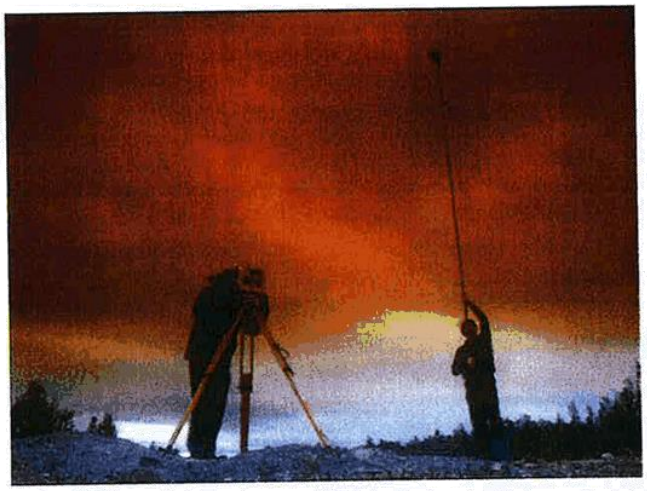


Figure 7 – Laser scanning survey in progress

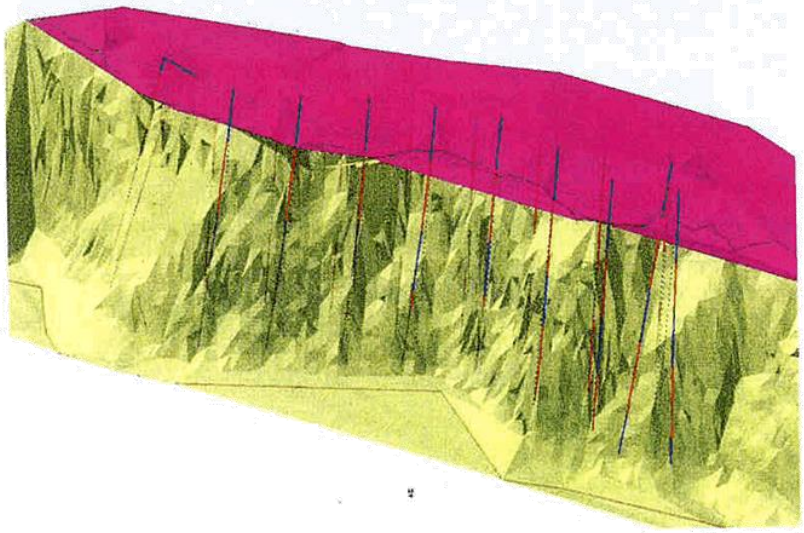


Figure 8 – Shows the 3D blast design in progress following laser scanning. The laser scanning process enables the blast designer to accurately position the front row blastholes.

Once the laser scanning and blast design process has occurred, the next step to controlling flyrock is to check the blasthole deviation following drilling. Most blastholes deviate away from designed positions during drilling due to geological variances that are drilled through, and it is very difficult to eliminate completely. Modern techniques to counter this deviation involve sending a probe down the blastholes which tracks the bearing, angle and depth of the blasthole. This is then compared to the designed blastholes through blast design software which calculates actual in hole burdens and separations when taking the deviation into account. This allows for any deviation to be appropriately managed and reduce the likelyhood of a flyrock event or overpressure event occurring. Figures 9 and 10 show the boretracking process and resultant information that is produced for the blast designers.

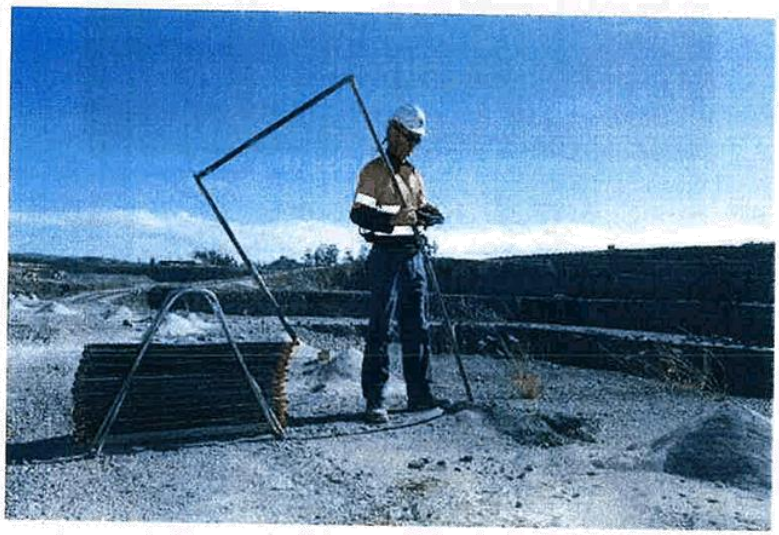


Figure 9 – Boretracking blastholes to determine actual blasthole track.

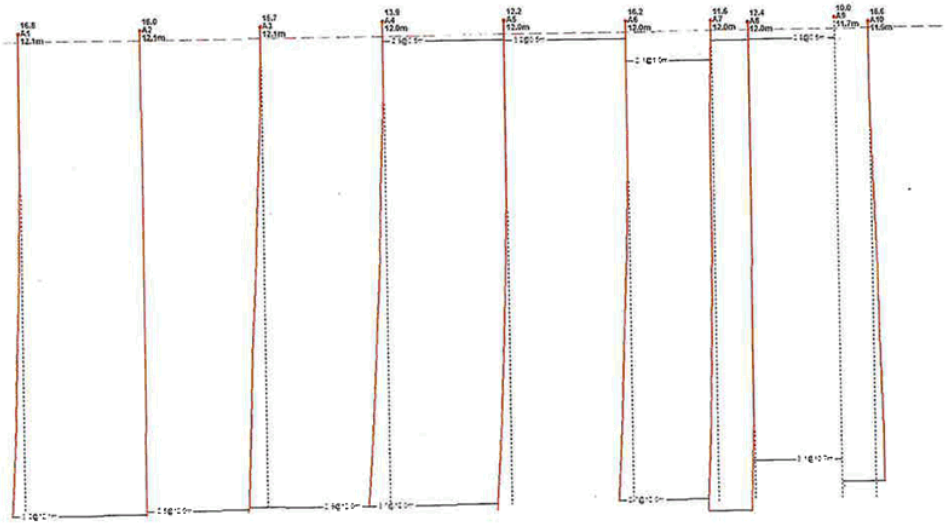


Figure 10 – An example of relatively minor blasthole deviations (red line) versus actual designed blasthole positions (dotted line).

Control of the loading of explosives thoughout a blast is also important to control flyrock. Blastholes need to be loaded with the specifically designed explosives and quantities to prevent a concentration of explosive energy, and to be stemmed with suitable material to a suitable depth. Blast loading controls should be established to ensure this is correctly managed. With these controls in place it is extremely unlikely that a flyrock event would occur.

7.2 Blast Vibration

Ground vibration induced by blasting is often a concern with residents living close to blasting activities. It is important to point out to neighbouring residents that blast induced ground vibration from typical quarry blasts will not produce the level of vibration required to damage their property. The human body is very perceptive to vibrations, so often nearby residents will feel vibrations produced as a result of a blasting event and incorrectly assume that there house may have been damaged by that vibration.

Limits that most quarry operators and government agencies work to regarding vibration and noise from blasting, are based around human comfort factors, not to prevent damage. These comfort limits are significantly less than that what would be required to produce even cosmetic damage to nearby residential homes or commercial structures.

To properly manage blasting vibrations, a good understanding of the quarry's vibration transmission properties must be developed, through either reviewing previous blasting records or through the development of a seed wave model as per the Blastronics investigation. Through these processes, blast loading and firing designs can be developed to ensure the vibration limits are upheld, and minimal disruption or nuisance is caused to quarry neighbours.

7.3 Blast Overpressure / Airblast

The majority of complaints received following a blasting event can be attributed to airblast. As the change in air pressure caused from a blasting event can rattle windows in nearby dwellings, it is often incorrectly perceived to be ground vibrations rather than airblast. Alternatively, the airblast may be audible (not always the case) and the 'startle' factor following an unexpected blast can often put neighbours on edge and obviously cause some discomfort or anxiety to humans and even pets or livestock in the vicinity.

There are a number of tried and tested, old and modern techniques that can be utilised to reduce the airblast produced from a blast event, some of which will be recommended in the updated blast parameters for such a reason.

8. Tuckombil Quarry EPA License limits and Blasting Disturbance Limits

8.1 Introduction

The Tuckombil Quarry extraction operation operates under NSW Environment Protection License number 3856. Typically an EPA license will have specific noise and vibration limits associated with blasting operations that will ultimately determine the design of a blast at any given location, to ensure that these limits are not exceeded.

The EPA license for Tuckumbil Quarry does not stipulate any environmental limits with regards to blasting operations. In such situations, to ensure appropriate controls are in place, it would be pertinent to adopt the recommendations suggested in the Australian Standard 2187.2, or as per the NSW EPA general recommendations.

At the time of the Blastronics report, the NSW EPA recommended that blasting overpressure and ground vibration limits should be set based on a 1990 document by the ANZEC (Australian and New Zealand Environment Council) called "Technical Basis for Guidelines to minimize annoyance due to blasting overpressure and ground vibration". This is still the document referred to by the NSW EPA in response to establishing blasting noise and ground vibration limits.

8.2 Ground Vibration Limits

The current Australian Standard 2187.2 – 2006 has been updated since the Blastronics report, and recommends the best practice approach is to base blasting ground vibration levels on frequency dependant criteria. The 1990 ANZEC document is outdated when compared with the Australian Standard 2187.2, 2006. Quoting from AS 2187.2 2006; *"Frequency - dependant limits have the capacity to precisely deal with the hazards presented by ground vibration, and are seen as the basis for best practice blasting"*. This differs from the limits recommended in the Blastronics report and ANZEC 1990 report, which are frequency independent.

As the EPA licence for the Tuckombil extraction operation does not set any blasting environmental impact limits, it is up to the licensed operator to ensure appropriate controls are taken to minimize disturbance to nearby residences. As such, and since the industry has evolved and developed a better understanding of blast vibration management, Orica recommends that the more recent Australian Standard (AS 2187.2 – 2006) be utilised as the basis for setting blasting limits at the Tuckombil Quarry.

Table 1 lists current frequency dependant limits in use at some quarries in QLD (eg Boral West Burleigh Quarry, Gold Coast, QLD) based on limits stipulated in the QLD Environmental Protection Act 1994 (Section 440ZB Blasting). It should be noted that these limits are below those recommended in AS 2187.2 – 2006, and are below cosmetic damage threshold limits. Given that the QLD quarries utilising these frequency dependant limits have close proximity neighbours similar to those at Tuckombil Quarry, these limits would be suitable for use at the Tuckombil Quarry.

Category	Vibration Frequency	Maximum Peak Particle Velocity
Sensitive Site*	Greater than 35 Hz	25 mm/s
Sensitive Site*	Less than or equal to 35 Hz	10 mm/s
Non-sensitive site and commercial premises	All Frequencies	25mm/s. Unless agreement is reached with occupier that a higher limit may apply.

*Houses, Low Rise residential Buildings, hospitals, theaters, schools and other similar buildings occupied by people.

Table 1: Example of limits for Blast induced ground vibration at Boral West Burleigh Quarry

8.3 Why use frequency dependant ground vibration limits?

Unfortunately for blasting contractors, people who are unfamiliar with blasting physics don't usually understand the relationship between velocity (the standard benchmark measurement for blasting vibration limits), frequency, displacement (ground movement) and the potential for damage with respect to blast induced vibrations. Simply put, different vibration frequencies with the same particle velocity will induce a different displacement on the material subjected to the vibration. The lower the frequency of the vibration wave for a given velocity, the greater the displacement (movement) of the object subject to the vibration, and the higher the potential for damage due to movement. Higher frequencies with the same particle velocity will produce lower displacements (movement), and hence decrease the potential for damage.

When analysing blast vibration levels and selecting limits which should apply to a quarry operation or construction project, it is essential to consider limits which have the lowest overall impact to the community. The impact upon people and property may be reduced by controlling not only the magnitude of vibration (velocity), but also by

increasing the frequency at which it is generated. Therefore, serious consideration should be given to choosing and using frequency based criteria for safe blasting.

In comparison, choosing a compliance limit that is unnecessarily low may actually increase the impact of blasting on the community, rather than reduce it. This is as a result of the blasting contractor having to select many more smaller blastholes and/or charge weights to blast a given volume to meet such low vibration limits. This will likely impact the quarry neighbours by resulting in a longer period of time when a blasthole drill rig is operating on site (blasthole drilling noise is often a nuisance to nearby residents) and a larger total number of blasting events, hence the overall impact of this operation on the neighbours becomes worse.

8.4 Airblast Limits

Air vibration, or airblast limits, are often based on human comfort levels, rather than potential damage levels, as damage will not be caused by airblast until significant levels are reached (in excess of 133 dBL). Standard levels recommended in both AS 2187.2 and the ANZEC 1990 document, are 115dBL for 95% of blasts in a given time period, with a max limit of 120dBL. Orica recommends utilising these limits as per the Blastronics report, as seen in table 2, with an additional limit for nearby commercial premises. Note there are different firing times than with the Blastronics report, to match those recommended in the ANZEC 1990 document.

Category	Air Overpressure
Sensitive Site*	115dBL 95% of blasts in reporting period. 120dBL Max limit. At most affected residence. Unless agreement is reached with occupier that a higher limit may apply.
Occupied non-sensitive sites such as factories and commercial premises	125dBL Max Limit. Unless agreement is reached with occupier that a higher limit may apply.

*Houses, Low Rise residential Buildings, hospitals, theaters, schools and other similar buildings occupied by people.

Firing times: Mon – Friday 9am – 3pm. No blasting on Saturdays, Sundays or Public Holidays

Table 2: Recommended limits for Airblast at the Tuckombil Quarry

8 Conclusion

Recent blasts at the Tuckombil quarry have been shown to be outside of the parameters recommended within the Blastronics report of 1995, and will have resulted in increased levels of nuisance to nearby residences than if the Blastronics parameters had been followed.

This review of blasting impacts at Tuckombil Quarry has also highlighted that the Blastronics report and its associated recommendations do not reflect recent advances in blasting technology, and ways this technology can be harnessed to reduce environmental impacts from blasting.

To ensure blasting impacts to neighbours is minimized, it is recommended that more contemporary blast vibration and airblast management techniques are utilised in future quarry blasts. This will allow management of the blast vibrations and airblast to be within current Australian Standard recommended levels for human comfort, as per the original aim of the Blastronics report. Quarry neighbours will therefore experience much lower blast nuisance levels than they have been used to with recent blasts.

9.1 Other recommendations for managing blasting impacts

- Installing permanent monitor blocks nearest sensitive residences, and have provision for monitoring at adhoc locations if requested by nearby residences.
- Utilising a 3rd party contractor to monitor blasting events to ensure transparency and impartial monitoring results.
- Greater auditing / review of blasting contractors methodologies and adherence to recommended best practice blasting methods.
- Establish a formal community liaison/communication process around quarry operational impacts with nearby residents.
- If quarry operators are to increase production significantly above existing levels Orica recommends conducting a new blast seed wave model investigation, to redefine vibration transmission characteristics using modern blasting products and methods.

C Environment Protection Licence

Section 55 Protection of the Environment Operations Act 1997

Environment Protection Licence

Licence - 3856

Licence Details	
Number:	3856
Anniversary Date:	16-April

Licensee

BALLINA SHIRE COUNCIL

PO BOX 450

BALLINA NSW 2478

Premises

TUCKOMBIL QUARRY

486 GAP ROAD

ALSTONVILLE NSW 2477

Scheduled Activity

Extractive activities

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

Region

North - North Coast

NSW Govt Offices, 49 Victoria Street

GRAFTON NSW 2460

Phone: (02) 6640 2500

Fax: (02) 6642 7743

PO Box 498 GRAFTON

NSW 2460

Section 55 Protection of the Environment Operations Act 1997

Environment Protection Licence

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NSW EPA

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Information about this licence

Dictionary

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

Responsibilities of licensee

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

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

Variation of licence conditions

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

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

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

Duration of licence

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

Licence review

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

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

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

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Environment Protection Licence

Licence - 3856

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

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

Transfer of licence

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

Public register and access to monitoring data

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

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

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

This licence is issued to:

BALLINA SHIRE COUNCIL

PO BOX 450

BALLINA NSW 2478

subject to the conditions which follow.

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Environment Protection Licence

Licence - 3856

1 Administrative Conditions

A1 What the licence authorises and regulates

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

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

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

A1.2 Notwithstanding A1.1, the scale of the land-based extractive activity authorised under this licence must not exceed 150,000 tonnes per annum, being the amount equivalent to the extraction limit approved by the development consent granted under the *Environmental Planning and Assessment Act 1979* for the premises specified in A2.

A2 Premises or plant to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
TUCKOMBIL QUARRY
486 GAP ROAD
ALSTONVILLE
NSW 2477
LOT 2 DP 1130300

A3 Information supplied to the EPA

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

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

Section 55 Protection of the Environment Operations Act 1997

Environment Protection Licence

Licence - 3856

2 Discharges to Air and Water and Applications to Land

P1 Location of monitoring/discharge points and areas

P1.1 The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.

P1.2 The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.

Water and land

EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
1	Discharge to waters Discharge quality monitoring	Discharge to waters Discharge quality monitoring	Discharge from pump outlet pipe to Branch Creek shown as "Quarry water discharge point" on drawing titled Tuckombil Quarry - Alstonville received on 10 March 2004.

3 Limit Conditions

L1 Pollution of waters

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

L2 Concentration limits

L2.1 For each monitoring/discharge point or utilisation area specified in the table\s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.

L2.2 Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.

L2.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table\s.

L2.4 Water and/or Land Concentration Limits

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POINT 1

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
Oil and Grease	milligrams per litre				10
Total suspended solids	milligrams per litre				50

L3 Volume and mass limits

L3.1 For each discharge point or utilisation area specified below (by a point number), the volume/mass of:
a) liquids discharged to water; or;
b) solids or liquids applied to the area;
must not exceed the volume/mass limit specified for that discharge point or area.

Point	Unit of Measure	Volume/Mass Limit
1	kilolitres per day	1500

L4 Noise limits

L4.1 Noise from the licensed premise must not exceed an LAeq (15 minute) noise emission criterion of 38, except as expressly provided by this licence.

L4.2 Noise from the premises is to be measured at the most affected residential receiver to determine compliance with this condition.

L5 Blasting

L5.1 Blasting operations at the premises may only take place between 9:00 a.m. to 15:00 Monday to Friday. (Where compelling safety reasons exist, the Authority may permit a blast to occur outside the abovementioned hours. Prior written (or facsimile) notification of any such blast must be made to the Authority).

L5.2 The airblast overpressure level from blasting operations in or on the premises must not exceed:

a) 115 dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period; and
b) 120 dB (Lin Peak) at any time.

At at any point within 1 metre of any affected dwelling unless the dwelling is subject to a private written agreeement

L5.3 The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed:

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

At within 1 metres of any residential dwelling unless the dwelling is subject to a private written agreeement

L5.4 All sensitive recievers are to begiven at least 24 hours notice when blasting is to be undertaken.

4 Operating Conditions

O1 Activities must be carried out in a competent manner

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

O2 Maintenance of plant and equipment

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

O3 Dust

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

5 Monitoring and Recording Conditions

M1 Monitoring records

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

M1.2 All records required to be kept by this licence must be:
a) in a legible form, or in a form that can readily be reduced to a legible form;
b) kept for at least 4 years after the monitoring or event to which they relate took place; and

c) produced in a legible form to any authorised officer of the EPA who asks to see them.

M1.3 The following records must be kept in respect of any samples required to be collected for the purposes of this licence:
a) the date(s) on which the sample was taken;
b) the time(s) at which the sample was collected;
c) the point at which the sample was taken; and
d) the name of the person who collected the sample.

M2 Requirement to monitor concentration of pollutants discharged

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

M2.2 Water and/ or Land Monitoring Requirements

POINT 1

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

M2.3 For the purposes of the table(s) above Special Frequency 1 means the collection of samples less than one hour after the commencement of any discharge. In the event of frequent discharges, no more than two each month are required.

M3 Testing methods - concentration limits

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

M4 Recording of pollution complaints

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

M4.2 The record must include details of the following:

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

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

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

M5 Telephone complaints line

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

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

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

6 Reporting Conditions

R1 Annual return documents

R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:
1. a Statement of Compliance,
2. a Monitoring and Complaints Summary,
3. a Statement of Compliance - Licence Conditions,
4. a Statement of Compliance - Load based Fee,
5. a Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan,
6. a Statement of Compliance - Requirement to Publish Pollution Monitoring Data; and
7. a Statement of Compliance - Environmental Management Systems and Practices.

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

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

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

b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

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

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

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

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

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

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

R2 Notification of environmental harm

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

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

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

R3 Written report

R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:
a) where this licence applies to premises, an event has occurred at the premises; or
b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence,
and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.

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

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

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

7 General Conditions

G1 Copy of licence kept at the premises or plant

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

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

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

Section 55 Protection of the Environment Operations Act 1997

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Dictionary

General Dictionary

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

Environment Protection Licence

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

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

Mr Nigel Sargent

Environment Protection Authority

(By Delegation)

Date of this edition: 12-May-2000

Section 55 Protection of the Environment Operations Act 1997

Environment Protection Licence

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End Notes

1 Licence varied by notice V/M upgrade, issued on 08-Jul-2000, which came into effect on 08-Jul-2000.

2 Licence varied by notice 1004230, issued on 21-Jun-2001, which came into effect on 16-Jul-2001.

3 Licence varied by notice 1027586, issued on 12-Jun-2003, which came into effect on 07-Jul-2003.

4 Licence varied by notice 1035243, issued on 16-Mar-2004, which came into effect on 10-Apr-2004.

5 Licence varied by notice 1036625, issued on 30-Apr-2004, which came into effect on 25-May-2004.

6 Licence transferred through application 145096, approved on 11-Sep-2007, which came into effect on 05-Sep-2007.

7 Condition A1.3 Not applicable varied by notice issued on <issue date> which came into effect on <effective date>

8 Licence varied by notice 1510029 issued on 10-Dec-2012

9 Licence varied by notice 1518757 issued on 30-Jan-2014

10 Licence varied by notice 1533193 issued on 21-Aug-2015

11 Licence transferred through application 1546045 approved on 27-Oct-2016 , which came into effect on 01-Nov-2016