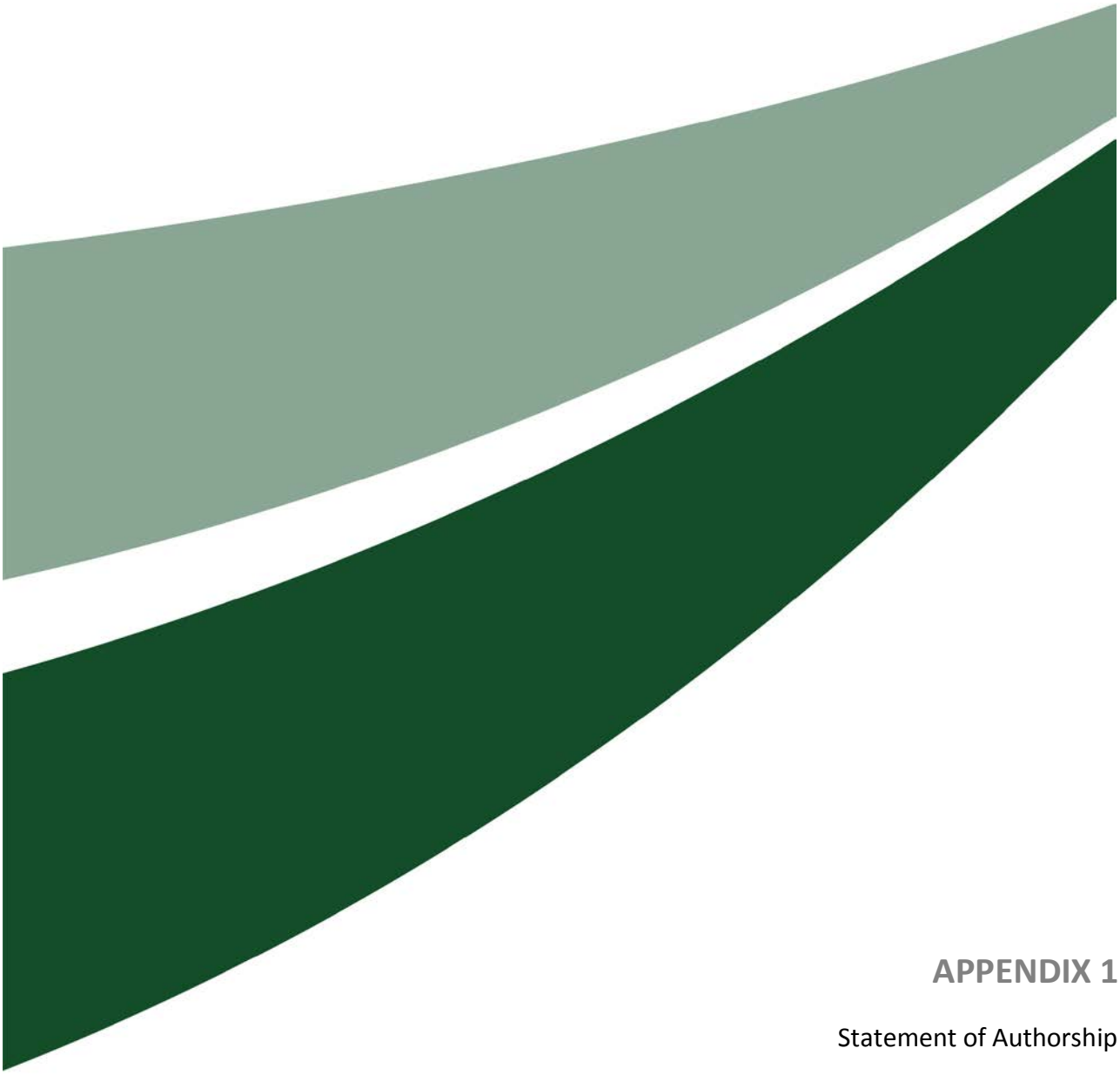

APPENDIX 1

Statement of Authorship

Statement of Authorship

EIS prepared by:

Name:	Peter Jamieson Director
Qualifications:	B. E. (Civil)
Address:	Umwelt (Australia) Pty Limited 75 York Street Teralba NSW 2284

In respect of

Applicant Name Applicant Address	Oberon Quarries Pty Limited 315 Commercial Road VINEYARD NSW 2765
Land to be developed: lot no, DP/MPS, vol/fol etc	Lot 2 DP 1087170, Lot 3 DP 1087170, Lot 107 DP 757067, Lot 108 DP 757067, Lot 94 DP 757067
Proposed Development:	Proposed Extended Life of Operations and Development Changes to Oberon Quarry

Environmental assessment

An Environmental Impact Statement (EIS) is attached.

Certification

I declare that:

- the statement has been prepared in accordance with Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*;
- the statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure; and
- that the information contained in the statement is neither false nor misleading.

Signature:
Name: Peter Jamieson
Date: 6 January 2015

APPENDIX 2

Director-General's Requirements

Major Projects Assessment
Mining & Industry Projects
Contact: Alice Smith
Phone: 9228 6336
Fax: 9228 6466
Email: alice.smith@planning.nsw.gov.au

Our Ref: 13/19007

Mr Neil Hargraves
Oberon Quarries Pty Ltd
PO Box 3575
ROUSE HILL NSW 2155

Dear Mr Hargraves

State Significant Development - Director-General's Requirements
Langley Heights Quarry Project (SSD-6333)

I have attached a copy of the Director General's environmental assessment requirements (DGRs) for the preparation of an Environmental Impact Statement (EIS) for the Langley Heights Quarry Project.

Please note that the Department may alter these requirements at any time, and that you must consult further with the Department if you do not lodge a development application and EIS for the project within two years of the date of issue of these DGRs. The Department will review the EIS for the project carefully before putting it on public exhibition, and will require you to submit an amended EIS if it does not adequately address the DGRs.

These requirements have been prepared based on the information you have provided to date and in consultation with the relevant government agencies and Oberon Council. Their comments, which you should consider and address appropriately in preparing the EIS, are also attached (see Attachment 1). Your project may require separate approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Department encourages you to confirm whether such an approval will be required as soon as possible. If an EPBC Act approval is required, I would appreciate it if you would advise the Department accordingly, as the Commonwealth approval process may be integrated into the NSW approval process, and supplementary DGRs may need to be issued.

I would appreciate it if you would contact the Department at least two weeks before you propose to submit the development application and EIS for your project. This will enable the Department to:

- confirm the applicable fee (see Division 1AA, Part 15 of the *Environmental Planning and Assessment Regulation 2000*); and
- determine the number of copies (hard-copy and CD-ROM) of the EIS required for review.

If you have any enquiries about these requirements, please contact Alice Smith at the details listed above.

Yours sincerely

DKitto 18/12/13

David Kitto
Director, Mining Projects
As delegate for the Director-General

Director General's Environmental Assessment Requirements

Section 78A(8A) of the *Environmental Planning and Assessment Act 1979*

State Significant Development

Application Number	SSD 6333
Development	The Langley Heights Quarry Project, which includes: • expanding an existing hard rock quarry to extract and process up to 400,000 tonnes of hard rock a year for up to 30 years; • upgrades of the quarry processing and transport infrastructure; • transporting product from the site via road; and • rehabilitating the site.
Location	Langley Heights, Oberon Quarry Road, in the Oberon LGA
Applicant	Oberon Quarries Pty Ltd
Date of Issue	18 December 2013
General Requirements (refer Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*)	The Environmental Impact Statement (EIS) for the proposal must include: • an executive summary; • a detailed description of the proposal, including: – identification of the resource; – description of the site; – a history of previous quarrying operations on the site; – the proposed works (including rehabilitation works); – the duration and intensity of extraction operations; – any likely interactions between the proposed operations and existing/approved development and land use in the area; and – a detailed justification for the proposal. • consideration of all relevant environmental planning instruments, including Part 3 of the *Mining, Petroleum Production and Extractive Industry State Environmental Planning Policy 2007*, and identification and justification of any inconsistencies with these instruments; • risk assessment of the potential environmental impacts of the proposal, identifying the key issues for further assessment; • detailed assessment of the key issues specified below, and any other significant issues identified in this risk assessment, which includes: – a description of the existing environment, using sufficient baseline data; – an assessment of the potential impacts of all stages of the proposal, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes; and – a description of the measures that would be implemented to avoid, minimise and if necessary, offset the potential impacts of the proposal; and • a conclusion justifying the proposal on economic, social and environmental grounds, taking into consideration whether the proposal is consistent with the objects of the *Environmental Planning and Assessment Act 1979*; and • a signed declaration from the author of the EIS, certifying that the information contained within the document is neither false nor misleading.

Key issues	The EIS must also assess the potential impacts of the proposal during the establishment, operation and decommissioning of the proposal. The EIS must describe what measures would be implemented to avoid, minimise, mitigate, offset, manage and/or monitor the potential impacts on: • **Land Resources** – including a detailed assessment of the potential impacts on: - soils and land capability, including an assessment of activities that would cause erosion and the measures proposed to minimise erosion and sedimentation; - landforms and topography, including cliffs, rock formations, steep slopes, etc; and - land use, including agricultural, forestry, conservation lands. • **Water Resources** – including: - identification of any licensing requirements or other approvals under the *Water Act 1912* and/or *Water Management Act 2000*; - an assessment of the potential impacts on the quality and quantity of existing surface and ground water resources; - a description of the measures proposed to ensure that the proposal can operate in accordance with the requirements of any relevant Water Sharing Plan or water source embargo; - an annual site water balance for representative years of the proposed life of the project; and - a detailed description of the proposed water management system, water monitoring program and other measures to mitigate surface and groundwater impacts; • **Air Quality** – including a quantitative assessment of potential: - construction and operational impacts, with a particular focus on dust emissions (including PM_{10} emissions, and dust generation from transport of quarry products), as well as diesel and blast fume emissions; - reasonable and feasible mitigation measures to minimise dust, diesel and blast fume emissions, including evidence that there are no such measures available other than those proposed; and - monitoring and management measures, in particular air quality monitoring; • **Noise, Vibration & Blasting** – including a quantitative assessment of potential: - construction, operational and off-site transport noise impacts; - blasting impacts on people, livestock and property; - reasonable and feasible mitigation measures, including evidence that there are no such measures available other than those proposed; and - monitoring and management measures; • **Biodiversity** – including: - accurate estimates of any vegetation clearing on site or for any road upgrades; - a detailed assessment of potential impacts of the proposal on any threatened species or populations or their habitats, endangered ecological communities and groundwater dependent ecosystems; and - a detailed description of the measures to maintain or improve the biodiversity values within the site in the medium to long term; • **Traffic & Transport** – including: - accurate predictions of the road traffic generated by the project; - an assessment of potential traffic impacts on the safety and efficiency of the road network; and - a detailed description of the measures that would be implemented to maintain and/or improve the capacity, efficiency and safety of the road network in the surrounding area over the life of the project; • **Heritage** – including: - an Aboriginal cultural heritage assessment (addressing both cultural and archaeological significance) which must demonstrate effective consultation with Aboriginal communities in determining and assessing

	impacts, and developing and selecting mitigation options and measures; • **Visual** – including: - a detailed assessment of the: o changing landforms on the site during the various stages of the project; and o potential visual impacts of the project on private landowners in the surrounding area as well as key vantage points in the public domain, including lighting impacts; and - a detailed description of the measures that would be implemented to minimise the visual impacts of the project; • **Waste** – including: - accurate estimates of the quantity and nature of the potential waste streams of the proposal, including reject material and the overburden emplacement strategy; and - a description of measures that would be implemented to minimise production of other waste, and ensure that that waste is appropriately managed; • **Hazards** – paying particular attention to public safety, including bushfires and transport or storage of any dangerous goods; and • **Social & Economic** – including an assessment of the: - potential direct and indirect economic benefits of the project for local and regional communities and the State; - potential impacts on local and regional communities, including: o increased demand for local and regional infrastructure and services; and o impacts on social amenity; - a detailed description of the measures that would be implemented to minimise the adverse social and economic impacts of the project, including any infrastructure improvements or contributions and/or voluntary planning agreement or similar mechanism; and - a detailed assessment of the costs and benefits of the proposal as a whole, and whether it would result in a net benefit for the NSW community; and • **Rehabilitation** – including the proposed rehabilitation strategy for the site, having regard to the key principles in the Strategic Framework for Mine Closure, including: - rehabilitation objectives, methodology, monitoring programs, performance standards and proposed completion criteria; - nominated final land use, having regard to any relevant strategic land use planning or resource management plans or policies; and - the potential for integrating this strategy with any other rehabilitation and/or offset strategies in the region.
Environmental Planning Instruments	The EIS must assess the proposal against the relevant environmental planning instruments, including (but not limited to): • *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007;* • *State Environmental Planning Policy (Infrastructure) 2007;* • *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development;* • *State Environmental Planning Policy No. 44 – Koala Habitat Protection;* • *State Environmental Planning Policy No. 55 – Remediation of Land;* • *Oberon Local Environmental Plan 1998;* and • relevant development control plans and section 94 plans, strategies and management plans.
Guidelines	The EIS must take into account relevant State Government policies and guidelines, in particular the *Industrial Noise Policy* (EPA 2001)*, Aquifer Interference Policy (*DPI 2012)*, Soils and Construction: Managing Urban Stormwater* (Landcom 2004)*, Guidelines for Fresh and Marine Water Quality and Guidelines for Water Quality Monitoring and Reporting* (ANZECC)*, Using the ANZECC Guideline and Water Quality Objectives in NSW* (DEC)*, Approved Methods for the Modelling and Assessment of Air Pollutants* (DEC)*, Approved*

	Methods for Sampling and Analysis of Air Pollutants (DEC), *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities – Working Draft* (DECC 2004), *The Threatened Species Assessment Guideline – The Assessment of Significance* (DECC 2007), *Draft Guidelines for the Assessment of Aquatic Ecology in EIA* (DUAP 1998), *Guide to investigation, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011), *Code of Practice of the Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010), *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010), *Draft Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation* (DEC 2005), *Guide to Traffic Generating Development* (RTA), *Road Design Guide* (RTA) or latest versions.
Consultation	During the preparation of the EIS, you must consult with Council and should consult with the relevant local, State and Commonwealth government authorities, service providers and community groups, and address any issues they may raise in the EIS. In particular, you should consult surrounding landowners and occupiers that are likely to be impacted by the proposal. Details of the consultations carried out and issues raised must be included in the EIS.
Further consultation after 2 years	If you do not lodge a DA and an EIS for the proposal within 2 years of the issue date of these DGRs, you must consult further with the Director-General in relation to the requirements for lodgement.

ATTACHMENT 1
Agency Input into Key Assessment Issues

NSW EPA

Your reference :
Our reference : EF13/3382; DOC13/88477
Contact : Mr Andrew Helms; (02) 6332 7604

Mr Howard Reed
Mining Projects – Development Assessment Systems and Approvals
Department of Planning & Infrastructure
GPO Box 39
SYDNEY, NSW, 2001

Attention: Ms Alice Smith

3 December 2013

Dear Mr Reed

LANGLEY HEIGHTS QUARRY – CONTINUED OPERATIONS PROJECT
EPA DIRECTOR GENERAL REQUIREMENTS

I refer to an email from Ms Alice Smith of the Department of Planning & Infrastructure (DP&I) to the Environment Protection Authority (EPA) dated 15 November 2013 seeking Director General Requirements (DGR's) for the proposed Langley Heights Quarry (or Oberon Quarry) project.

The EPA has reviewed the document titled "*Oberon Quarries – Proposed Extended Life of Operations and Modifications to Oberon Quarry – Preliminary Environmental Assessment*" dated November 2013, that accompanied the abovementioned email, and has identified the information that it requires to adequately assess the proposal in Attachment A. General Guidance material is provided in Attachment B. In summary, the EPA's key information requirements for the proposal include an adequate assessment of:

- Air quality impacts;
- Noise impacts;
- Water Management including site water management;
- Management of chemicals & wastes.

The Langley Heights Quarry is currently a scheduled activity (Extractive Activities) under the *Protection of the Environment Operations Act 1997* (POEO Act) and holds an Environment Protection Licence (licence) with the EPA. Should project approval be granted, the proponent may need to make an application to the EPA to vary the licence to capture any relevant conditions of project consent issued by DP&I.

Should you have any further enquiries in relation to this matter please contact Mr Andrew Helms at the Central West (Bathurst) Office of the EPA by telephoning (02) 6332 7604.

Yours sincerely

DARRYL CLIFT
Head Central West Unit
Environment Protection Authority

Enclosures Attachment 1 – EPA's requirements for EIS
Attachment 2 – General Guidance Material

PO Box 1388 Bathurst NSW 2795
Level 2, 203 – 209 Russell Street Bathurst NSW 2795
Tel: (02) 6332 7600 · Fax: (02) 6332 7630
ABN 43 692 285 758
www.epa.nsw.gov.au

ATTACHMENT A

EPA's RECOMMENDED DIRECTOR GENERAL REQUIREMENTS
(November 2013)

1. Environmental impacts of the project

Environmental Impact Statements (EIS) should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned. A full list of guidelines is at **Attachment 2**.

2. Air issues

The EIS should include a detailed air quality impact assessment (AQIA). The AQIA should:

1. Identify all potential discharges of fugitive and point source emissions of pollutants including dust for all stages of the proposal and assess the risk associated with those emissions. All processes that could result in air emissions must be identified and described. Sufficient detail to accurately communicate the characteristics and quantity of all emissions must be provided. Assessment of risk relates to environmental harm, risk to human heath and amenity.
2. Justify the level of assessment undertaken on the basis of risk factors, including but not limited to:
   a. proposal location;
   b. characteristics of the receiving environment; and
   c. type and quantity of pollutants emitted.
3. Describe the receiving environment in detail. The proposal must be contextualised within the receiving environment (local, regional and inter-regional as appropriate). The description must include but need not be limited to:
   a. meteorology and climate;
   b. topography;
   c. surrounding land-use; receptors; and
   d. ambient air quality.
4. Include a consideration of 'worst case' emission scenarios and impacts at proposed emission limits.
5. Account for cumulative impacts associated with existing emission sources as well as any currently approved developments linked to the receiving environment.
6. Include air dispersion modelling where there is a risk of adverse air quality impacts, or where there is sufficient uncertainty to warrant a rigorous numerical impact assessment. Air dispersion modelling must be conducted in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (2005) http://www.environment.nsw.gov.au/resources/air/ammodelling05361.pdf.
7. Demonstrate the proposal's ability to comply with the relevant regulatory framework, specifically the *Protection of the Environment Operations (POEO) Act (1997)* and the *POEO (Clean Air) Regulation (2010)*.
8. Provide an assessment of the project in terms of the priorities and targets adopted under the NSW State Plan 2010 and its implementation plan Action for Air.
9. Detail emission control techniques/practices that will be employed by the proposal.

3. Noise and vibration

In relation to noise, the following matters should be addressed (where relevant) as part of the Environmental Assessment.

1. Construction noise associated with the proposed development should be assessed using the *Interim Construction Noise Guideline* (DECC, 2009). http://www.environment.nsw.gov.au/noise/constructnoise.htm
2. Operational noise from all industrial activities (including private haul roads and private railway lines) to be undertaken on the premises should be assessed using the guidelines contained in the *NSW Industrial Noise Policy* (EPA, 2000) and *Industrial Noise Policy Application Notes.* http://www.environment.nsw.gov.au/noise/industrial.htm
3. Noise on public roads from increased road traffic generated by land use developments should be assessed using the guidelines contained in the *Environmental Criteria for Road Traffic Noise* (EPA, 1999). http://www.environment.nsw.gov.au/noise/traffic.htm
4. Noise from new or upgraded public roads should be assessed using the *Environmental Criteria for Road Traffic Noise* (EPA, 1999). http://www.environment.nsw.gov.au/ noise/traffic.htm

In relation to blasting and blast vibration, the following matters should be addressed (where relevant) as part of the Environmental Assessment.

5. Vibration from all activities (including construction and operation) to be undertaken on the premises should be assessed using the guidelines contained in the *Assessing Vibration: a technical guideline* (DEC, 2006). http://www.environment.nsw.gov.au/noise/vibrationguide.htm
6. If blasting is required for any reasons during the construction or operational stage of the proposed development, blast impacts should be demonstrated to be capable of complying with the guidelines contained in *Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* (ANZEC, 1990). http://www.environment.nsw.gov.au/noise/blasting.htm

4. Waste, chemicals and hazardous materials and radiation

The EIS should:

1. Identify, characterise and classify all waste that will be generated onsite through excavation, demolition or construction activities, including proposed quantities of the waste.
   Note: All waste must be classified in accordance with *DECCW's Waste Classification Guidelines.*
2. Identify, characterise and classify all waste that is proposed to be disposed of to an offsite location, including proposed quantities of the waste and the disposal locations for the waste. This includes waste that is intended for re-use or recycling.

   Note: All waste must be classified in accordance with *DECCW's Classification Guidelines.*
3. Include a commitment to retaining all sampling and classification results for the life of the project to demonstrate compliance with *DECCW's Waste Classification Guidelines.*
4. Provide details of how waste will be handled and managed onsite to minimise pollution, including:

   a) Stockpile location and management

- Labelling of stockpiles for identification, ensuring that all waste is clearly identified and stockpiled separately from other types of material (especially the separation of any contaminated and non-contaminated waste).
- Proposed height limits for all waste to reduce the potential for dust and odour.
- Procedures for minimising the movement of waste around the site and double handling.
- Measures to minimise leaching from stockpiles into the surrounding environment, such as sediment fencing, geofabric liners etc.

b) Erosion, sediment and leachate control including measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site during works. The EIS should show the location of each measure to be implemented. The Proponent should consider measures such as:

- Sediment traps
- Diversion banks
- Sediment fences
- Bunds (earth, hay, mulch)
- Geofabric liners
- Other control measures as appropriate

The Proponent should also provide details of:

- how leachate from stockpiled waste material will be kept separate from stormwater runoff;
- treatment of leachate through a wastewater treatment plant (if applicable); and
- any proposed transport and disposal of leachate off-site.

6. Provide details of how the waste will be handled and managed during transport to a lawful facility. If the waste possesses hazardous characteristics, the Proponent must provide details of how the waste will be treated or immobilised to render it suitable for transport and disposal.
7. Include details of all procedures and protocols to be implemented to ensure that any waste leaving the site is transported and disposed of lawfully and does not pose a risk to human health or the environment.
8. Include a statement demonstrating that the Proponent is aware of OEH's requirements with respect to notification and tracking of waste as appropriate.
9. Include a statement demonstrating that the Proponent is aware of the relevant legislative requirements for disposal of the waste, including any relevant Resource Recovery Exemptions, as gazetted by the EPA from time to time.
10. Outline contingency plans for any event that affects operations at the site that may result in environmental harm, including (but not limited to) excessive stockpiling of waste and the detection of asbestos in waste materials brought on to the site.

5. Water and soils

5.1 Soil issues

The EIS should include:

1. An assessment of potential impacts on soil and land resources should be undertaken, being guided by *Soil and Landscape Issues in Environmental Impact Assessment* (DLWC 2000). The nature and extent of any significant impacts should be identified. Particular attention should be given to:
   a. Soil erosion and sediment transport - in accordance with *Managing urban stormwater: soils and construction,* vol. 1 (Landcom 2004) and vol. 2 (A. Installation of services; B Waste landfills; C. Unsealed roads; D. Main Roads; E. Mines and quarries) (DECC 2008).
   b. Mass movement (landslides) – in accordance with *Landslide risk management* guidelines presented in Australian Geomechanics Society (2007).
   c. Urban and regional salinity – guidance given in the Local Government Salinity Initiative booklets which includes *Site Investigations for Urban Salinity* (DLWC, 2002).
2. A description of the mitigation and management options that will be used to prevent, control, abate or minimise identified soil and land resource impacts associated with the project. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

5.2 Water Issues

The EIS should:

1. Describe water usage for the proposal including the position of any intakes and discharges, volumes, water quality and frequency of all water discharges.
2. Demonstrate that all practical options to avoid discharge have been implemented and environmental impact minimised where discharge is necessary.
3. Where relevant include a water balance for the development including water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.
4. Describe existing surface and groundwater quality. An assessment needs to be undertaken for any water resource likely to be affected by the proposal.
5. State the Water Quality Objectives for the receiving waters relevant to the proposal. These refer to the community's agreed environmental values and human uses endorsed by the NSW Government as goals for ambient waters (http://www.environment.nsw.gov.au/ieo/index.htm). Where groundwater may be impacted the assessment should identify appropriate groundwater environmental values.
6. State the indicators and associated trigger values or criteria for the identified environmental values. This information should be sourced from the ANZECC (2000) Guidelines for Fresh and Marine Water Quality (http://www.mincos.gov.au/publications/australian and new zealand guidelines for fresh and marine water quality).
7. State any locally specific objectives, criteria or targets which have been endorsed by the NSW Government.
8. Describe the nature and degree of impact that any proposed discharges will have on the receiving environment.
9. Assess impacts against the relevant ambient water quality outcomes. Demonstrate how the proposal will be designed and operated to:
   - protect the Water Quality Objectives for receiving waters where they are currently being achieved; and

- contribute towards achievement of the Water Quality Objectives over time where they are not currently being achieved.

10. Where a discharge is proposed that includes a mixing zone, the proposal should demonstrate how wastewater discharged to waterways will ensure the ANZECC (2000) water quality criteria for relevant chemical and non-chemical parameters are met at the edge of the initial mixing zone of the discharge, and that any impacts in the initial mixing zone are demonstrated to be reversible.
11. Assess impacts on groundwater and groundwater dependent ecosystems.
12. Describe how stormwater will be managed both during and after construction.
13. Describe how predicted impacts will be monitored and assessed over time.

ATTACHMENT B: EPA GUIDANCE MATERIAL

Title	Web address
Relevant Legislation	
Contaminated Land Management Act 1997	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+140+1997+cd+0+N
Environmentally Hazardous Chemicals Act 1985	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+14+1985+cd+0+N
Environmental Planning and Assessment Act 1979	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+203+1979+cd+0+N
Protection of the Environment Operations Act 1997	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+156+1997+cd+0+N
Licensing	
EPA Guide to Licensing	www.environment.nsw.gov.au/licensing/licenceguide.htm
Air Issues	
Air Quality	
Approved methods for modelling and assessment of air pollutants in NSW (2005)	http://www.environment.nsw.gov.au/resources/air/ammodelling05361.pdf
POEO (Clean Air) Regulation 2002	http://www.legislation.nsw.gov.au/maintop/view/inforce/subordleg+642+2002+cd+0+N
Noise and Vibration	
Interim Construction Noise Guideline (DECC, 2009)	http://www.environment.nsw.gov.au/noise/constructnoise.htm
Assessing Vibration: a technical guideline (DEC, 2006)	http://www.environment.nsw.gov.au/noise/vibrationguide.htm
Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZEC, 1990)	http://www.environment.nsw.gov.au/noise/blasting.htm
Industrial Noise Policy Application Notes	http://www.environment.nsw.gov.au/noise/traffic.htm
Environmental Criteria for Road Traffic Noise (EPA, 1999)	http://www.environment.nsw.gov.au/noise/traffic.htm
Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects (DECC, 2007)	http://www.environment.nsw.gov.au/noise/railinfranoise.htm
Environmental assessment requirements for rail traffic-generating developments	http://www.environment.nsw.gov.au/noise/railnoise.htm

Title	Web address
Waste, Chemicals and Hazardous Materials and Radiation	
Waste	
Environmental Guidelines: Solid Waste Landfills (EPA, 1996)	http://www.environment.nsw.gov.au/resources/waste/envguidlns/solidlandfill.pdf
Draft Environmental Guidelines - Industrial Waste Landfilling (April 1998)	http://www.environment.nsw.gov.au/resources/waste/envguidlns/industrialfill.pdf
Waste Classification Guidelines (DECC, 2008)	http://www.environment.nsw.gov.au/waste/envguidlns/index.htm
EPA Resource recovery exemptions	http://www.environment.nsw.gov.au/waste/RRecoveryExemptions.htm
Water and Soils	
Soils – general	
Soil and Landscape Issues in Environmental Impact Assessment (DLWC 2000)	http://www.dnr.nsw.gov.au/care/soil/soil_pubs/pdfs/tech_rep_34_new.pdf
Managing urban stormwater: soils and construction, vol. 1 (Landcom 2004) and vol. 2 (A. Installation of services; B Waste landfills; C. Unsealed roads; D. Main Roads; E. Mines and quarries) (DECC 2008)	Vol 1 - Available for purchase at http://www.landcom.com.au/whats-new/publications-reports/the-blue-book.aspx Vol 2 - http://www.environment.nsw.gov.au/stormwater/publications.htm
Landslide risk management guidelines	http://www.australiangeomechanics.org/resources/downloads/
Site Investigations for Urban Salinity (DLWC, 2002)	http://www.environment.nsw.gov.au/resources/salinity/booklet3siteinvestigationsforurbansalinity.pdf
Local Government Salinity Initiative Booklets	http://www.environment.nsw.gov.au/salinity/solutions/urban.htm
Water	
Water Quality Objectives	http://www.environment.nsw.gov.au/ieo/index.htm
ANZECC (2000) Guidelines for Fresh and Marine Water Quality	http://www.mincos.gov.au/publications/australian_and_new_zealand_guidelines_for_fresh_and_marine_water_quality
Applying Goals for Ambient Water Quality Guidance for Operations Officers – Mixing Zones	http://deccnet/water/resources/AWQGuidance7.pdf
Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2004)	http://www.environment.nsw.gov.au/resources/legislation/approvedmethods-water.pdf

Alice Smith - RE: Langley Heights Quarry - Continued Operations - Input into DGRs

From: Gary Wallace <Gary.Wallace@oberon.nsw.gov.au>
To: 'Alice Smith' <Alice.Smith@planning.nsw.gov.au>
Date: 12/5/2013 2:40 PM
Subject: RE: Langley Heights Quarry - Continued Operations - Input into DGRs

Alice

Council has investigated the information provided and indicates from initial information provided Council has no additional comment to make in relation to the Pre EA.

Council advises that it will provide formal comment during the exhibition period of the application.

Council thanks the department for including Council in the pre EA process

Regards

Gary Wallace

From: Alice Smith [mailto:Alice.Smith@planning.nsw.gov.au]
Sent: Friday, 15 November 2013 3:08 PM
To: Andrew.Helms@epa.nsw.gov.au; council; development.western@rms.nsw.gov.au; info@sca.nsw.gov.au; landuse.enquiries@dpi.nsw.gov.au; landuse.minerals@industry.nsw.gov.au; planning.matters@environment.nsw.gov.au
Cc: cressida.gilmore@industry.nsw.gov.au; Gary Wallace; greg.paine@industry.nsw.gov.au; referrals@water.nsw.gov.au; Sonya.Ardill@environment.nsw.gov.au
Subject: Langley Heights Quarry - Continued Operations - Input into DGRs

Dear all,

Langley Heights Quarry - Continued Operations Project
Request for Input into Director-General's Requirements

Oberon Quarries has requested DGRs for the continued operations of the Langley Heights Quarry, near Oberon in the Oberon local government area.

The proposal involves:

- the extension of the life of the quarry for an additional 30 years to allow for continued extraction of the remaining 10 Mt of basalt reserves within the approved extraction area;
- 1 hectare extension of the existing extraction area, within the project footprint;
- removal of the ten year annual average production limitation;
- installation of a second diesel fuel storage tank;
- replacement of some of the existing screening plant, reconfiguration of the alignment of the screens

and the inclusion of an additional cone crusher; and
- production and supply of manufactured sand.

Further information on the proposal is included in the Preliminary Environmental Assessment (see attached).

The development is a State Significant Development under Part 4 of the *Environmental Planning and Assessment Act 1979.* You are invited to provide input into the drafting of the DGRs for an Environmental Impact Statement for the development.

It would be greatly appreciated if you would please provide your input into the DGRs by **Friday 6 December 2013.**

Please contact me if you have any enquiries on this matter.

Kind regards
Alice

Alice Smith
Environmental Planning Officer | Mining Projects
Department of Planning & Infrastructure
23-33 Bridge Street SYDNEY 2000 | GPO Box 39 SYDNEY 2001
ph: 02 9228 6336 | e: alice.smith@planning.nsw.gov.au

Office of Environment & Heritage

Your reference:
Our reference: DOC13/90874
Contact: Terry Mazzer
02 6683 5313

Alice Smith
Environmental Planning Officer
NSW Department of Planning & Infrastructure
GPO Box 39
Sydney NSW 2001

Dear Alice

RE Request for input into DGRs for Langley Heights Quarry Continued Operations (SSD)

Thank you for your email (dated 15th November 2013) seeking the requirements of the Office of Environment and Heritage (OEH) for the preparation of an Environmental Impact Statement (EIS) for the above proposal.

In summary, the OEH's key information requirements for the proposal include an adequate assessment of:

1. Impacts to Aboriginal cultural heritage objects; and
2. Impacts on flora, fauna, threatened species, populations, communities and their habitats.

OEH can provide advice on the EIS where the EIS deals with natural and cultural heritage conservation issues. OEH may also comment on the legitimacy of the conclusions reached regarding the significance of impacts by the proposed development to these components of the environment.

The *Environmental Planning and Assessment Act 1979* (EP&A Act) requires that the EIS should fully describe the proposal, the existing environment and impacts of the proposal.

This letter directs you primarily to our generic guidance material. However, please note that it is up to the proponent (and later the consent authority after appropriate consultation) to determine the detail and comprehensiveness of the surveys and level of assessment required to form legally defensible conclusions regarding the impact of the proposal. The scale and intensity of the proposed development should dictate the level of investigation. It is important that all conclusions are supported by adequate data.

The OEH has responsibilities under the:

- *National Parks and Wildlife Act 1974* - namely the protection and care of Aboriginal objects and places, the protection and care of native flora and fauna and the protection and management of reserves,
- *Threatened Species Conservation Act 1995* which aims to conserve threatened species of flora and fauna, populations and ecological communities to promote their recovery and manage processes that threaten them,

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- *Native Vegetation Conservation Act 2003* – ensuring compliance with the requirements of this legislation.

It is the responsibility of the proponent and consent authority to adequately consider the requirements under the *Environmental Planning and Assessment Act 1979* (EP&A Act), including flora, fauna, threatened species, populations and ecological communities and their habitats, and cultural heritage.

OEH understands from the correspondence that the proposed activity is a State Significant Development application pursuant to Part 4 of the *EP&A Act 1979*. As such OEH only has a statutory role in assessing such an activity if the determining authority determines that the activity is likely to significantly affect a threatened species, population, ecological community, or its habitat, as listed under the *Threatened Species Conservation (TSC) Act 1995.*

Flora, Fauna and Threatened Species

As this proposal may impact on a number of threatened species and their habitat it is important that the EIS include a comprehensive flora and fauna report. following the requirements of the Environmental Assessment Guidelines included in attachment B.

These guidelines address requirements under the *Environmental Planning and Assessment Act 1979* and OEH's areas of responsibility relating to flora, fauna and threatened species, populations and ecological communities and their habitats.

Cultural Heritage

The importance of protecting Aboriginal Cultural Heritage is reflected in the provisions under Part 6 of the *NP&W Act 1974*, as amended. That Act clearly establishes that Aboriginal objects and places are protected and may not be harmed, disturbed or desecrated without appropriate authorisation.

Under the *NP&W Act 1974*, it is the responsibility of each individual proposing to conduct ground disturbance works to ensure that they have conducted a due diligence assessment to avoid harming Aboriginal objects by the proposed activity. OEH has produced a generic due diligence process, which is not mandatory to follow, however any alternative process followed must be able to demonstrate their process was reasonable and practicable in attempts to avoid harm to Aboriginal objects.

Consultation must also be in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010) as set by OEH if impact to cultural heritage is unavoidable.

Further advice regarding Aboriginal cultural heritage can be found on the OEH web-site at: http://www.environment.nsw.gov.au/licences/achregulation.htm. and within guidance documents listed in Attachment C.

Should you require further information on flora, fauna or cultural heritage please contact Terry Mazzer, Conservation Planning Officer on (02) 6883 5302 or terry.mazzer@environment.nsw.gov.au.

Yours sincerely,

SONYA ARDILL
Senior Team Leader Planning, North West Region
Regional Operations

ATTACHMENT A: EIS REQUIREMENTS FOR THE LANGLEY HEIGHTS QUARRY CONTINUED OPERATION (SSD)

1 Environmental impacts of the project

1.1. Impacts related to the following environmental issues need to be assessed, quantified and reported on:

- Aboriginal cultural heritage
- Biodiversity

The Environmental Impact Statement (EIS) should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned. A full list of guidelines is at **Attachment C**.

2. Aboriginal cultural heritage

The EIS report should contain:

- A description of the Aboriginal objects and declared Aboriginal places located within the area of the proposed development.
- A description of the cultural heritage values, including the significance of the Aboriginal objects and declared Aboriginal places, that exist across the whole area that will be affected by the proposed development, and the significance of these values for the Aboriginal people who have a cultural association with the land.
- A description of how the requirements for consultation with Aboriginal people as specified in clause 80C of the National Parks and Wildlife Regulation 2009 have been met.
- The views of those Aboriginal people regarding the likely impact of the proposed development on their cultural heritage. If any submissions have been received as a part of the consultation requirements, then the report must include a copy of each submission and your response.
- A description of the actual or likely harm posed to the Aboriginal objects or declared Aboriginal places from the proposed activity, with reference to the cultural heritage values identified.
- A description of any practical measures that may be taken to protect and conserve those Aboriginal objects or declared Aboriginal places.
- A description of any practical measures that may be taken to avoid or mitigate any actual or likely harm, alternatives to harm or, if this is not possible, to manage (minimise) harm.
- A specific Statement of Commitment that the proponent will complete an Aboriginal Site Impact Recording Form and submit it to the Aboriginal Heritage Information Management System (AHIMS) Registrar, for each AHIMS site that is harmed through the proposed development.

In addressing these requirements, the proponent must refer to the following documents:

a) *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010) - http://www.environment.nsw.gov.au/licences/consultation.htm. This document further explains the consultation requirements that are set out in clause 80C of the National Parks and Wildlife Regulation 2009. The process set out in this document must be followed and documented in the Environmental Assessment Report.

b) *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010) http://www.environment.nsw.gov.au/licences/archinvestigations.htm. The process described in this Code should be followed and documented where the assessment of Aboriginal cultural heritage requires an archaeological investigation to be undertaken.

Notes:

1. An Aboriginal Site Impact Recording Form (http://www.environment.nsw.gov.au/licences/DECCAHIMSSiteRecordingForm.htm) must be completed and submitted to the Aboriginal Heritage Information Management System (AHIMS) Registrar, for each AHIMS site that is harmed through archaeological investigations required or permitted through these environmental assessment requirements.

2. Under section 89A of the *National Parks and Wildlife Act* 1974, it is an offence for a person not to notify OEH of the location of any Aboriginal object the person becomes aware of, not already recorded on the Aboriginal Heritage Information Management System (AHIMS). An AHIMS Site Recording Form should be completed and submitted to the AHIMS Registrar (http://www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm), for each Aboriginal site found during investigations.

3 Biodiversity

Biodiversity impacts can be assessed using **either** the BioBanking Assessment Methodology (scenario 1) or a detailed biodiversity assessment (scenario 2). The requirements for each of these approaches are detailed below.

The BioBanking Assessment Methodology can be used **either** to obtain a BioBanking statement, or to assess impacts of a proposal and to determine required offsets without obtaining a statement. In the latter instances, if the required credits are not available for offsetting, appropriate alternative options may be developed in consultation with OEH officers and in accordance with the 'NSW OEH interim policy on assessing and offsetting biodiversity impacts of Part 3A, State significant development (SSD) and State significant infrastructure (SSI) projects.'

Scenario 1 - Where a proposal is assessed using the BioBanking Assessment Methodology (BBAM)

1. Where a BioBanking Statement is being sought under Part 7A of the *Threatened Species Conservation* Act 1995 (TSC Act), the assessment must be undertaken by an accredited BioBanking assessor (as specified under Section 142B (1)(c) of the TSC Act 1995) and done in accordance with the *BioBanking Assessment Methodology and Credit Calculator Operational Manual* (DECCW, 2008). To qualify for a BioBanking Statement a proposal must meet the 'improve or maintain' standard.

1a. The Environmental Impact Statement (EIS) should include a specific Statement of Commitments that reflects all requirements of the BioBanking Statement including the number of credits required and any DG approved variations to impact on Red Flags.

2. Where the BioBanking Assessment Methodology is being used to assess impacts of a proposal and to determine required offsets, and a BioBanking Statement is not being obtained, the EIS should contain a detailed biodiversity assessment and all components of the assessment must be undertaken in accordance with the *BioBanking Assessment Methodology and Credit Calculator Operational Manual* (DECCW, 2008).

2a. The EIS should include a specific Statement of Commitments which:
- is informed by the outcomes of the proposed BioBanking assessment offset package;

- sets out the ecosystem and species credits required by the BioBanking Assessment Methodology and how these ecosystem and/or species credits will be secured and obtained;
- if the ecosystem or species credits cannot be obtained, provides appropriate alternative options to offset expected impacts, noting that an appropriate alternative option may be developed in consultation with OEH officers and in accordance with OEH policy;
- demonstrates how all options have been explored to avoid red flag areas; and
- includes all relevant 'BioBanking files (e.g. *.xml output files), data sheets, underlying assumptions (particularly in the selection of vegetation types from the vegetation types database), and documentation (including maps, aerial photographs, GIS shape files, other remote sensing imagery etc.) to ensure that the OEH can conduct an appropriate review of the assessment.

3. Where the 'NSW OEH interim policy on assessing and offsetting biodiversity impacts of Part 3A, State significant development (SSD) and State significant infrastructure (SSI) projects' is being used then the proponent must stipulate which level(s) of offset is being offered in relation to each of the vegetation communities and threatened species that require species credits. In accordance with the interim policy, justification must be provided as to why it is appropriate to apply the Tier 2 ('no net loss') or Tier 3 ('mitigated net loss') outcomes. In considering whether the mitigated net loss standard is appropriate, justification must be provided on: (i) whether the credits required by the calculator are available on the market; (ii) whether alternative offset sites (other than credits) are available on the market; and (iii) the overall cost of the offsets and whether these costs are reasonable given the circumstances'. This must be to satisfaction of, and in consultation with, OEH.

4. Where appropriate, likely impacts (both direct and indirect) on any adjoining and/or nearby OEH estate reserved under the *National Parks and Wildlife Act 1974* or any marine and estuarine protected areas under the *Fisheries Management Act 1994* or the *Marine Parks Act 1997 s*hould be considered. Please refer to the *Guidelines for developments adjoining land and water managed by the Department of Environment, Climate Change and Water* (DECCW, 2010).

5. With regard to the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, the assessment should identify and assess any relevant Matters of National Environmental Significance and whether the proposal has been referred to the Commonwealth or already determined to be a controlled action.

Scenario 2 - Where a proposal is assessed outside the BioBanking Assessment Methodology:

1. The EIS should include a detailed biodiversity assessment, including assessment of impacts on threatened biodiversity, native vegetation and habitat. This assessment should address the matters included in the following sections.

2. A field survey of the site should be conducted and documented in accordance with relevant guidelines, including :
   - the *Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna - Amphibians* (DECCW, 2009);
   - *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft* (DEC, 2004); and
   - Threatened species survey and assessment guideline information on www.environment.nsw.gov.au/threatenedspecies/surveyassessmentgdlns.htm.
   - Commonwealth survey requirements (birds, bats, reptiles, frogs, fish and mammals): http://www.environment.gov.au/epbc/publications/guidelines.html. These are relevant when species or communities listed under the *Environment Protection and Biodiversity Conservation Act* are present.

   It is preferable for proponents to use the Interim Vegetation Mapping Standard data form to collect the vegetation plot data for the project site, and any offset site associated with the project. This will

provide data that is useful for vegetation mapping as well as in the BioBanking Assessment Methodology. This is available at http://www.environment.nsw.gov.au/research/VISplot.htm.

If a proposed survey methodology is likely to vary significantly from the above methods, the proponent should discuss the proposed methodology with the OEH prior to undertaking the EIS, to determine whether the OEH considers that it is appropriate.

Recent (less than five years old) surveys and assessments may be used. However, previous surveys should not be used if they have:

- been undertaken in seasons, weather conditions or following extensive disturbance events when the subject species are unlikely to be detected or present, or
- utilised methodologies, survey sampling intensities, timeframes or baits that are not the most appropriate for detecting the target subject species,

unless these differences can be clearly demonstrated to have had an insignificant impact upon the outcomes of the surveys. If a previous survey is used, any additional species listed under the TSC Act since the previous survey took place, must be surveyed for.

Determining the list of potential threatened species for the site must be done in accordance with the *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft* (DEC, 2004) and the *Guidelines for Threatened Species Assessment* (Department of Planning, July 2005).

The OEH Threatened Species website http://www.environment.nsw.gov.au/threatenedspecies/ and the *Atlas of NSW Wildlife* database must be the primary information sources for the list of threatened species present.

The BioBanking Threatened Species Database, the Vegetation Types databases (available on OEH website at http://www.environment.nsw.gov.au/biobanking/biobankingtspd.htm and http://www.environment.nsw.gov.au/biobanking/vegtypedatabase.htm, respectively) and other data sources (e.g. PlantNET, Online Zoological Collections of Australian Museums (http://www.ozcam.org/), previous or nearby surveys etc.) may also be used to compile the list.

3. The EIS should contain the following information as a minimum:
   a. The requirements set out in the *Guidelines for Threatened Species Assessment* (Department of Planning, July 2005);
   b. Description and geo-referenced mapping of study area (and associated spatial data files), e.g. overlays on topographic maps, satellite images and/or aerial photos, including details of map datum, projection and zone, all survey locations, vegetation communities (including classification and methodology used to classify), key habitat features and reported locations of threatened species, populations and ecological communities present in the subject site and study area. Separate spatial files (.shp format) to be provided to the OEH should include, at a minimum, shapefiles of the project site, impact footprint, vegetation mapping and classification for both the impact and any offset site(s);
   c. Description of survey methodologies used, including timing, location and weather conditions;
   d. Detailed description of vegetation communities (including classification and methodology used to classify) and including all plot data. Plot data should be supplied to the OEH in electronic format (eg MS-Excel) and organised by vegetation community;
   e. Details, including qualifications and experience of all staff undertaking the surveys, mapping and assessment of impacts as part of the EIA;
   f. Identification of national and state listed threatened biota known or likely to occur in the study area and their conservation status;
   g. Description of the likely impacts of the proposal on biodiversity and wildlife corridors, including direct and indirect and construction and operation impacts. Wherever possible, quantify these impacts such as the amount of each vegetation community or species habitat to be cleared or impacted, or any fragmentation of a wildlife corridor;

h. Identification of the avoidance, mitigation and management measures that will be put in place as part of the proposal to avoid or minimise impacts, including details about alternative options considered and how long term management arrangements will be guaranteed;
i. Description of the residual impacts of the proposal. If the proposal cannot adequately avoid or mitigate impacts on biodiversity, then a biodiversity offset package is expected (see the requirements for this at point 6 below); and
j. Provision of specific Statement of Commitments relating to biodiversity.

4. An assessment of the significance of direct and indirect impacts of the proposal must be undertaken for threatened biodiversity known or considered likely to occur in the study area based on the presence of suitable habitat. This assessment must take into account:
   a. the factors identified in s.5A of the EP&A Act; and
   b. the guidance provided by *The Threatened Species Assessment Guideline – The Assessment of Significance (DECCW, 2007)* which is available at: http://www.environment.nsw.gov.au/resources/threatenedspecies/tsaguide07393.pdf

5. Where an offsets package is proposed by a proponent for impacts to biodiversity (and a BioBanking Statement has not been sought) this package should:
   a) Meet either the OEH's *Principles for the use of biodiversity offsets in NSW*[1], which are available at: www.environment.nsw.gov.au/biocertification/offsets.htm, or the 'NSW OEH interim policy on assessing and offsetting biodiversity impacts of Part 3A, State significant development (SSD) and State significant infrastructure (SSI) projects.'
   b) Identify the conservation mechanisms to be used to ensure the long term protection and management of the offset sites; and
   c) Include an appropriate Management Plan (such as vegetation or habitat) that has been developed as a key amelioration measure to ensure any proposed compensatory offsets, retained habitat enhancement features within the development footprint and/or impact mitigation measures (including proposed rehabilitation and/or monitoring programs) are appropriately managed and funded.

6. Where appropriate, likely impacts (both direct and indirect) on any adjoining and/or nearby OEH estate reserved under the *National Parks and Wildlife Act 1974* or any marine and estuarine protected areas under the *Fisheries Management Act 1994* or the *Marine Parks Act 1997 s*hould be considered. Refer to the *Guidelines for developments adjoining land and water managed by the Department of Environment, Climate Change and Water* (DECC, 2010).

7. With regard to the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, the assessment should identify any relevant Matters of National Environmental Significance and whether the proposal has been referred to the Commonwealth or already determined to be a controlled action.

[1] Please note that the OEH's *Principles for the use of biodiversity offsets in NSW* ('the Principles') and the NSW OEH interim policy on assessing and offsetting biodiversity impacts of Part 3A, State significant development (SSD) and State significant infrastructure (SSI) projects ('the Interim policy') require offsets to be based on a quantitative assessment of the loss in biodiversity from the proposal and the gain in biodiversity from the offset. The methodology must be based on the best available science, be reliable, and used for calculating both the impact and offset sites. Even where a proponent does not intend to use the BioBanking Assessment Methodology and Credit Calculator (Scenario 1), use of a suitable alternative metric, justified in the EA, is necessary to demonstrate that the proposal is consistent with the Principles or the Interim policy. Ultimately the proponent is expected to demonstrate quantitatively that the biodiversity losses associated with the project will be adequately compensated for by the improvement in vegetation condition and security expected from the offset site. This cannot be properly determined by a hectare comparison alone.

ATTACHMENT B: EIA REQUIREMENTS - FLORA AND FAUNA

INTRODUCTION

The *Environmental Planning and Assessment Act (1979)* (*EP&A Act*) requires that proponents of a development/activity and the Consent/Determining Authorities adequately assess the impact of a development or activity in any Environmental Impact Assessment (EIA) documents. These EIA documents include:

- Statement of Environmental Effects (SoEE), or
- Review of Environmental Factors (REF), or
- Environmental Impact Statement (EIS).

These are introductory, generic specifications of the Office of Environment and Heritage (OEH) for an adequate assessment of the impacts of a development proposal on native flora and fauna (ie including protected and threatened species). However, OEH recognises that the scale and complexity of the project will to some extent, dictate the level of information that is required to address the questions posed below. Consequently, flora and fauna assessments need to be tailored to suit the proposal. For example, a development which is proposed on land which has already been totally (or substantially) cleared should address the issues raised below but the amount of work required to address these issues may be substantially less than if the area comprised undisturbed bushland and, therefore, of more significant wildlife habitat value. A preliminary assessment, including a desktop investigation and a preliminary site inspection, may indicate the need for a detailed survey of the site.

It is up to the proponent (and later the consent and/or determining authorities after appropriate consultation) to determine the detail and comprehensiveness of assessment required to form legally defensible conclusions regarding the impact of the proposal. The scale and intensity of the proposed development should dictate the detail of investigation.

It is important that all conclusions are supported by adequate data and that these data are clearly presented in EIA documentation.

OEH will consider the following issues when reviewing an EIA document:

1. **Concerns** - What are OEH's concerns regarding the conservation of natural and cultural heritage in accordance with the relevant legislation? Is the proposal likely to affect natural and cultural heritage? How?
2. **Provision of Information** - Is adequate information provided for a valid assessment of the impacts?
3. **Validity of Conclusions** - Has the proponent arrived at valid conclusions as a result of the assessment of impacts?
4. **Recommended Conditions to Consent** - Should Consent or Approval be granted, what conditions (if any) are required to ensure that the project is developed, and thereafter managed in accordance with natural and cultural heritage conservation and the provisions of legislation administered by OEH?

Thus the EIA document should fully describe the existing environment including flora and fauna, so that future impacts can be properly assessed and then reviewed (eg during the public participation phase).

FLORA

Background

The Australian flora comprises many endemic taxa and is therefore unique in the world.

OEH is concerned at the extent to which vegetation has been cleared and otherwise modified in north-western NSW. This high level of modification has been highlighted in the National State of the Environment Reports (1996 and 2001). Evidence strongly suggests that many plant species and communities are threatened with extinction.

Although the proposed site may be disturbed by various landuses, any remnants of native vegetation are of significant natural heritage value, including riparian and wetland areas. The area of vegetation and habitat at the proposed site may provide an area of high biological diversity, high conservation value or may not be well represented or protected elsewhere. It may also act as a corridor or migratory route for wildlife, drought refuge habitat or have other important values.

The NSW community places a high value on those areas of native vegetation that remain. OEH is committed to the protection, appropriate management, and where necessary, rehabilitation of native vegetation. For these reasons, OEH considers that careful planning should precede any development that involves further vegetation clearance or other significant impact within areas of remnant vegetation.

Negative impacts to native vegetation (eg clearing) should be avoided where possible. Where impacts cannot be avoided, the EIA should detail how a "maintain or improve" outcome for biodiversity will be achieved. Biobanking provides a voluntary mechanism through which this can be achieved. The Biobanking assessment methodology allows quantification of impacts and assessment of the value of offset areas and associated management regimes for those areas. The biobanking scheme provides an alternative path for proponents to the current threatened species assessment of significance process.

Information about Biobanking is located on OEH's website at http://www.environment.nsw.gov.au/biobanking/

Report Requirements

The EIA documentation should include a report on the flora that includes the following:

- detailed location map and identification of the area surveyed (including the location of photographs, transects, areas of significance etc),
- at least one of the following: a land satellite image, vegetation communities map, aerial photograph, or a remnant vegetation map,
- A map identifying the vegetation communities located in the study area and the areas of each vegetation community to be impacted.
- a complete plant list (including scientific names of those plants) of all tree, shrub, ground cover and aquatic species, categorised according to country of origin (ie., native versus exotic),
- a detailed description of vegetation structure (in terms of a scientifically accepted classification system) and spatial distribution (i.e. plant densities and patterning) on the site, including a vegetation map,
- describe the condition and integrity of the vegetation including a description of any past disturbance,
- an account of the likely original vegetation communities (pre-, or at early settlement), and an assessment of the likely regional distribution of the original communities,
- an assessment of whether the plant communities are adequately represented in conservation reserves or otherwise protected,

- an account of the hydrology of the area and how this relates to the dynamics of the vegetation communities,
- a list of **known** and **likely** threatened species as listed under Schedules 1 & 2 (*Threatened Species Conservation Act 1995*) which might occur at the site. The OEH database needs to be accessed and the likelihood of occurrence of threatened flora species determined,
- an assessment of the impacts of the proposal on flora, on-site and off-site (eg siltation, water availability or drainage changes) and measures to mitigate these impacts,
- an assessment of the significance of the impact of the development at both the site and at the regional scale,
- a detailed rehabilitation/management plan including a list of the plant species to be used during rehabilitation (if required),
- detail methodologies used and a list of the reference literature cited, and
- any other issues that may be considered relevant.

The above guidelines will provide some of the information necessary to conduct an Assessment of Significance required for threatened flora and fauna under Section 5a of the *EP&A Act*, should threatened species be likely or known to occur in the locality of the subject development proposal. Similarly, it will provide some of the information required if an application is found to be necessary under the *Native Vegetation Act (2003)*. However the above relates mostly to the specific environmental assessment processes under the *EP&A Act* and does not constitute an Assessment of Significance.

Similarly, the above guidelines will provide some of the information required for Biobanking, but may not be sufficient for Biobanking offset calculations. Please refer to the Biobanking website or contact OEH for specific information relating to Biobanking assessment requirements. The Biobanking scheme provides an alternative path for proponents to the current threatened species assessment of significance process.

FAUNA

Background

Evidence suggests that Western NSW has suffered the highest extinction rate for indigenous mammals of any region in the world. Many other vertebrate species are currently threatened. One of the major reasons for such a high level of extinction has been the destruction of habitat. Native vegetation including wetland, riparian and remnant environments are very significant areas of fauna habitat. Therefore any development in such areas should fully consider the impact on fauna and its habitat.

Report Requirements

The EIA document should include a report on the fauna (including protected and threatened species), that includes the following:

- detailed location map and identification of the area surveyed (including the location of photographs, transects, areas of significance etc),
- at least one of the following: a land satellite image, vegetation communities map, aerial photograph, or a remnant vegetation map,
- a complete list of all **known** and **likely** terrestrial and aquatic species (eg birds, mammals, reptiles and amphibians including scientific names). It is suggested that invertebrates also be considered as they form part of the food chain for many fauna species,

- those species which are protected, threatened or listed under any international agreements, as well as introduced species,
- those species known or likely to breed in the area,
- any species which have specific habitat requirements found within the project area,
- those species or populations which may be near the limit of their geographic range or are a disjunct/isolated population,
- assessment of the importance or otherwise of the location as a corridor, migratory route or drought refuge, in relation to other remnant vegetation, riparian and wetland areas or habitat in the region,
- assessment of the impacts of the proposal on all fauna and its habitat, at both the site and at the regional scale,
- identification of any mitigation measures proposed to limit or ameliorate the impact of the proposal,
- detailed methodologies used and a list of the reference literature cited, and,
- any other issues that may be considered relevant.

Again, the above guidelines will provide some of the information required for the Threatened Species component of Biobanking, but may not be sufficient for Biobanking offset calculations. Please refer to the Biobanking website or contact OEH for specific information relating to Biobanking assessment requirements

SEPP No. 44 - Koala Habitat Protection

The Shire may be listed in Schedule 1 of SEPP No. 44 - Koala Habitat Protection. If so, the requirements of the SEPP regarding Koala habitat protection should be considered by the proponents.

THREATENED SPECIES OF FAUNA AND FLORA

Background

Apart from the need to consider the impact on protected species, the proponent will need to address the requirements of legislation that currently governs threatened species protection and impact assessment in NSW.

The *Threatened Species Conservation Act (1995)* (*TSC Act*) protects all threatened flora and fauna native to NSW (excluding fish and marine plants). The proponent will need to consider the provisions of this Act.

The *TSC Act* contains lists of threatened species, which are divided into a number of categories – those presumed extinct, endangered species, critically endangered species and vulnerable species. It also contains lists of endangered populations, endangered ecological communities, critically endangered ecological communities and vulnerable ecological communities. This Act also allows for the declaration of critical habitat, key threatening processes and the preparation of both Recovery Plans and Threat Abatement Plans. These listings and plans must be considered as part of the EIA process.

If an activity or development is proposed in a locality likely or known to be occupied by a threatened species, population, ecological community or critical habitat, any potential impact to that threatened species must be taken into account during the development assessment process. However under the *EP&A Act*, some types of development are not required to go through approval processes. Please note that a licence may still be required under the *TSC Act* if such a development/activity is likely to harm a threatened species, population or ecological community.

Proponents can voluntarily use BioBanking to minimise and offset their impacts on biodiversity. The scheme provides an alternative path for proponents to the current threatened species assessment of significance process.

Assessment of Significance & Species Impact Statements

If during the flora or fauna assessment or survey, threatened species are **found** or are **likely** to occur in the area, the proponents must undertake an Assessment of Significance as outlined in section 5A of the *EP&A Act* to determine whether or not the development would be likely to have a significant impact upon threatened species.

The Assessment of Significance is a statutory mechanism which allows decision makers to assess whether a proposed development or activity is likely to have a significant effect on threatened species, populations or ecological communities, or their habitats.

The Assessment of Significance is contained within section 5A of the *EP&A Act* and consists of seven factors which need to be addressed for informed decisions to be made regarding the effect of a proposed development or activity on threatened species, populations or ecological communities, or their habitats. A copy of OEH's *Threatened species assessment guidelines: The assessment of significance* can be obtained from the OEH website at:

http://www.environment.nsw.gov.au/resources/threatenedspecies/tsaguide07393.pdf

Following threatened species assessment via the Assessment of Significance, it may be necessary to prepare a Species Impact Statement (SIS). The proponent will need to prepare a SIS in the following circumstances:

- If (after having addressed Section 5A) the flora/fauna assessment concludes that there is likely to be a significant impact to threatened species, or
- The proposed development is likely to affect critical habitat declared under the TSC Act.

If a SIS is required, the proponent (not the consultant) must write to OEH for any formal requirements for the SIS that he might deem appropriate. The SIS must then be prepared in accordance with these requirements and provided to the OEH. In some instances the Minister for the Environment will also need to be consulted for approval.

Methods to reduce the impact on the protected and threatened species should be considered fully, and are considered an integral requirement within any SIS document.

The OEH advises that conducting an Assessment of Significance or an SIS according to the provisions of the *EP&A Act* and the *TSC Act* is a complex task and should be undertaken by suitably qualified person(s).

AVAILABLE DATA

OEH can supply, at the standard cost, fauna prediction data and recorded fauna sightings data (Wildlife Atlas of NSW) to help in the investigation. The following information on site recordings of Flora and Fauna is available from OEH:

- A general search for flora and fauna records can be conducted through the Atlas of NSW Wildlife at: http://www.bionet.nsw.gov.au/

  Please note that not all the information associated with the individual records is available on this website. You can apply to the Office of Environment and Heritage for more detailed information about individual sightings (terms and conditions apply). Contact the Wildlife Data Unit for more information on (02) 9995 5000.

- Detailed information relating to threatened species, populations, ecological communities and their habitats can be obtained from the OEH Threatened Species website at:

  http://www.threatenedspecies.environment.nsw.gov.au/index.aspx

Other reference literature may be available for the subject locality/region. The proponent should explore this possibility thoroughly.

ATTACHMENT C – GUIDANCE MATERIAL

Title	Web Address
Commonwealth Environment Protection & Biodiversity Conservation Act 1999	http://www.austlii.edu.au/au/legis/cth/consol_act/epabca1999588/
Environmental Planning and Assessment Act 1979	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+203+1979+cd+0+N
Fisheries Management Act 1994	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+38+1994+cd+0+N
National Parks and Wildlife Act 1974	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+80+1974+cd+0+N
Threatened Species Conservation Act 1995	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+101+1995+cd+0+N
Water Management Act 2000	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+92+2000+cd+0+N
Aboriginal Cultural Heritage	
Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (2005)	Available from DoP.
Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010)	http://www.environment.nsw.gov.au/licences/consultation.htm
Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010)	http://www.environment.nsw.gov.au/licences/archinvestigations.htm
Due Diligence Code for the Protection of Aboriginal Objects in NSW (DECCW 2010)	http://www.environment.nsw.gov.au/resources/cultureheritage/ddcop/10798ddcop.pdf
Aboriginal Site Impact Recording Form	http://www.environment.nsw.gov.au/licences/DECCAHIMSSiteRecordingForm.htm
Aboriginal Heritage Information Management System (AHIMS) Registrar	http://www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm
Biodiversity	
BioBanking Assessment Methodology (DECC, 2008)	http://www.environment.nsw.gov.au/resources/biobanking/08385bbassessmethod.pdf
BioBanking Assessment Methodology and Credit Calculator Operational Manual (DECCW, 2008)	http://www.environment.nsw.gov.au/biobanking/calculator.htm
Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna –Amphibians (DECCW, 2009)	http://www.environment.nsw.gov.au/resources/threatenedspecies/09213amphibians.pdf
Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities – Working Draft (DEC, 2004)	http://www.environment.nsw.gov.au/resources/nature/TBSAGuidelinesDraft.pdf

Survey requirements (birds, bats, reptiles, frogs, fish and mammals) for species listed under the EPBC Act	http://www.environment.gov.au/epbc/publications/guidelines.html
DECCW Threatened Species website	http://www.environment.nsw.gov.au/threatenedspecies/
Atlas of NSW Wildlife	http://www.environment.nsw.gov.au/wildlifeatlas/about.htm
BioBanking Threatened Species Database	http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/home_species.aspx
Vegetation Types databases	http://www.environment.nsw.gov.au/biobanking/vegtypedatabase.htm
PlantNET	http://plantnet.rbgsyd.nsw.gov.au/
Online Zoological Collections of Australian Museums	http://www.ozcam.org/
Threatened Species Assessment Guideline - The Assessment of Significance (DECCW, 2007)	http://www.environment.nsw.gov.au/resources/threatenedspecies/tsaguide07393.pdf
Principles for the use of biodiversity offsets in NSW	http://www.environment.nsw.gov.au/biocertification/offsets.htm

Alice Smith - Langley Heights Quarry - DGR's

From: Wayne Jones <wayne.jones@dpi.nsw.gov.au>
To: <alice.smith@planning.nsw.gov.au>
Date: 12/6/2013 3:15 PM
Subject: Langley Heights Quarry - DGR's

HI Alice
Please see following draft DPI comment on the above project. Formal response should follow soon.
Regards
Wayne
OUT13/36251
Ms Alice Smith
Mining Projects
NSW Department of Planning and Infrastructure
GPO Box 39
SYDNEY NSW 2001
Dear Ms Smith,

Langley Heights Quarry
Request for input into Director General Requirements

I refer to your email dated 15 November 2013 to the Department of Primary Industries in respect to the above matter.

Comment by NSW Office of Water

NSW Office of Water provides detailed comment and recommendations in Attachment A, and general requirements in Attachment B.
For further information please contact Tim Baker, Senior Water Regulation Officer (Dubbo Office) on 6841 7403 or at tim.baker@water.nsw.gov.au.

Comment by Agriculture NSW

Agriculture NSW refers the proponent to the guideline *Agriculture Issues for Extractive Industry Development* available at the following link; http://www.dpi.nsw.gov.au/agriculture/resources/lup/development-assessment/extractive-industries.
For further information contact Mary Kovac, Resource Management Officer (Dubbo Office) on 6881 1250 or at mary.kovac@industry.nsw.gov.au.

Comment by Crown Lands

Crown Lands advise that there are 2 crown roads affected by the extension. The proponent will need to arrange closure of the roads or transfer to Council who can then approve any works to be undertaken on the roads.
For further information please contact Paul Crain, Property Management Project Officer, (Orange Office) on 6391 4312 or at paul.crain@lands.nsw.gov.au.

Comment by Fisheries NSW

Fisheries NSW advise no issues.
For further information please contact David Ward, Fisheries Conservation Manager (Tamworth office) on 6763 1255 or at: david.ward@industry.nsw.gov.au.

Attachment A
Langley Heights Quarry
Request for Input into Director General Requirements
Comment by NSW Office of Water

The NSW Office of Water has reviewed the Preliminary Environmental Assessment and provides the following advice to be addressed in preparation of the Environmental Impact Statement (EIS).

1. Key Issues

NSW Office of Water requires the EIS for the proposal to demonstrate the following:

1. Adequate and secure water supply for the proposal. Confirmation that water supplies for construction and operation are sourced from an appropriately authorised and reliable supply.
2. Identification of site water demands, water sources (surface and groundwater), water disposal methods and water storage structures in the form of a water balance. The water balance is to outline the proposed water management on the site and to also include details of any water reticulation infrastructure that supplies water to and within the site.
3. Assessment of modification requirements to existing surface water management controls and an impact assessment where amendments are required. Details are requested on the size of water management infrastructure capturing runoff and identification of dirty and clean water catchments. Final landform in terms of the potential for surface water capture is also requested.

4. An impact assessment on adjacent licensed water users (surface and groundwater), riparian ecosystems and groundwater-dependent ecosystems.
5. An assessment of the potential to intercept groundwater and predicted maximum annual dewatering volumes, water quality and disposal/retention methods. This is to also include the groundwater take requirements for a number of stages both during quarry operations and post quarry life until an equilibrium is achieved.
6. An impact assessment of any proposed works within or adjacent to watercourses and adequate provision of buffer requirements. This is to include the proposed road duplication and any requirements for additional infrastructure. Ability to achieve the principles of the *Water Management Act 2000* and the requirements of the *Guidelines for Controlled Activities on Waterfront Land* will be required. The relevant guidelines can be accessed at the following link: http://www.water.nsw.gov.au/Water-Licensing/Approvals/Controlled-activities/default.aspx
7. Existing and proposed water licensing requirements in accordance with the Water Act 1912 and *Water Management Act 2000* (whichever is relevant). This is to demonstrate that existing licences (include licence numbers) and licensed uses are appropriate, and to identify where additional licences are proposed.
8. Adequate mitigating and monitoring requirements to address surface water and groundwater impacts.

A general list of environmental assessment requirements to be addressed in the EIS is provided in Attachment B. The proposal is located within the Lachlan Fold Belt MDB Groundwater Source of the Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources and the Fish River Water Source of the Water Sharing Plan for the Macquarie Bogan Unregulated and Alluvial Water Source. ny requirement for additional groundwater or surface water entitlement will need to be obtained through purchase and trade in accordance with these plans. These plans can be accessed at the following link: http://www.water.nsw.gov.au/Water-management/Water-sharing/default.aspx

Attachment B

Langley Heights Quarry
Request for Input into Director General Requirements
General Environmental Assessment Requirements - NSW Office of Water

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Relevant Legislation

The assessment is required to take into account the requirements of the following legislation (administered by the Office of Water), as applicable:

- *Water Management Act 2000 (WMA 2000)*.
- *Water Act 1912*.

In particular, proposals and management plans should be consistent with the Objects (s.3) and Water Management Principles (s.5) of the *WMA*.

Water Sharing Plans

Gazetted Water Sharing Plans (WSPs) prepared under the provisions of the *WMA* establish rules for access to, and the sharing of water between the environmental needs of the surface or groundwater source and water users. If the proposal is within a gazetted WSP area the assessment is required to demonstrate how the proposal is consistent with the relevant access and trading rules of the WSP. Refer to: *http://www.water.nsw.gov.au/Water-Management/Water-sharing/default.aspx* The following WSPs are relevant to the site.

- *Water Sharing Plan for the NSW Murray-Darling Basin Fractured Rock Groundwater Sources 2012*
- *Water Sharing Plan for the Macquarie-Bogan Unregulated and Alluvial Water Sources 2012*

Relevant Policies

The assessment is required to take into account the following NSW Government policies, as applicable:

1. *NSW Aquifer Interference Policy (2012)*
2. *NSW Groundwater Policy Framework Document General (August 1997)*
3. *NSW Groundwater Quality Protection Policy (1998)*
4. *NSW State Groundwater Dependent Ecosystem Policy (2002)*
5. *NSW State Rivers and Estuaries Policy (1993)*
6. *NSW Sand and Gravel Extraction Policy for Non-Tidal Rivers (1992)*
7. *NSW Wetlands Policy (2010)*

These documents can be found at:
http://www.water.nsw.gov.au/Water-Management/Law-and-Policy/Key-policies/default.aspx

Guidelines

The assessment is required to take into account the following guidelines as applicable:

1. *Australian Groundwater Modelling Guidelines (2012)*
2. *MDBC Guidelines on Groundwater Flow Modelling (2000)*
3. *Guidelines for the Assessment and Management of Groundwater Contamination (2007)*

4. *Guidelines for Controlled Activities on Waterfront Land*:
    a. Riparian corridors (and associated Vegetation Management Plans)
    b. Watercourse crossings
    c. Laying pipes and cables in watercourses
    d. Outlet structures
    e. In-stream works

These documents can be found at:
http://www.water.nsw.gov.au/Water-Licensing/Approvals/Controlled-activities/default.aspx
http://archive.nwc.gov.au/library/waterlines/82

Groundwater

The Office of Water is responsible for the management of groundwater resources so they can sustain environmental, social and economic uses for the people of New South Wales.

Groundwater Source

The assessment is required to identify groundwater issues and potential degradation to the groundwater source and provide the following:

(i) Details of the predicted highest groundwater table at the development site.
(ii) Details of any works likely to intercept, connect with or result in pollutants infiltrating into the groundwater sources.
(iii) Details of any proposed groundwater extraction, including purpose, location and construction details of all proposed bores and expected annual extraction volumes.
(iv) Describe the flow directions and rates and the physical and chemical characteristics of the groundwater source.
(v) Details of the predicted impacts of any final landform on the groundwater regime.
(vi) Details of the existing groundwater users within the area (including the environment) and include details of any potential impacts on these users.
(vii) Assessment of the quality of the groundwater for the local groundwater catchment.
(viii) Details of how the proposed development will not potentially diminish the current quality of groundwater, both in the short and long term.
(ix) Details on preventing groundwater pollution so that remediation is not required.
(x) Quantification of impacts on groundwater dependent ecosystems (GDEs).
(xi) Details on protective measures to minimise any impacts on groundwater dependent ecosystems.
(xii) Details of proposed methods of the disposal of waste water and approval from the relevant authority.
(xiii) Assessment of the potential for saline intrusion of the groundwater and measures to prevent such intrusion into the groundwater aquifer.
(xiv) Details of the results of any models or predictive tools used to predict groundwater drawdown, inflows to the site and impacts on affected water sources.

Where potential impact/s are identified the assessment will need to identify limits to the level of impact and contingency measures that would remediate, reduce or manage potential impacts to the existing groundwater resource and any dependent groundwater environment or water users, including information on:

- Details of any proposed monitoring programs, including water levels and quality data.
- Reporting procedures for any monitoring program including mechanism for transfer of information.
- Description of the remedial measures or contingency plans proposed.

Licensing

- All proposed groundwater works, including bores for the purpose of investigation, extraction, dewatering, testing or monitoring must be identified in the proposal and an approval obtained from the Office of Water prior to their installation. Approved SSD and SSI projects may be excluded from the requirement for approvals due to Section 89J and 115ZG of the *Environmental Planning and Assessment Act 1979*.
- All predicted groundwater take must be accounted for through adequate licensing.

Groundwater Dependent Ecosystems (GDEs)

The assessment is required to identify any impacts on GDEs. GDEs are ecosystems which have their species composition and natural ecological processes wholly or partially determined by groundwater. GDEs represent a vital component of the natural environment. GDEs can vary dramatically in how they depend on groundwater from having occasional or no apparent dependence through to being entirely dependent. GDEs occur across both the surface and subsurface landscapes ranging in area from a few metres to many kilometres. Increasingly, it is being recognised that surface and groundwaters are often interlinked and aquatic ecosystems may have a dependence on both.

Ecosystems that can depend on groundwater and that may support threatened or endangered species, communities and populations, include:

(i) Terrestrial vegetation that show seasonal or episodic reliance on groundwater.
(ii) River base flow systems which are aquatic and riparian ecosystems in or adjacent to streams/rivers dependent on the input of groundwater to base flows.
(iii) Aquifer and cave ecosystems.
(iv) Wetlands.

(v) Estuarine and near-shore marine discharge ecosystems.
(vi) Fauna which directly depend on groundwater as a source of drinking water or that live within water which provide a source.

The *NSW Aquifer Interference Policy* and the *NSW Groundwater Dependent Ecosystem Policy* provides guidance on the protection and management of GDEs. It sets out management objectives and principles to:

(i) Ensure the most vulnerable and valuable ecosystems are protected.
(ii) Manage groundwater extraction within defined limits thereby providing flow sufficient to sustain ecological processes and maintain biodiversity.
(iii) Ensure sufficient groundwater of suitable quality is available to ecosystems when needed.
(iv) Ensure the *precautionary principle* is applied to protect GDEs, particularly the dynamics of
(v) flow and availability and the species reliant on these attributes.

A number of gazetted WSPs list and map priority GDEs and set out the management strategies and actions for sharing and protecting groundwater quality, quantity and dependent ecosystems. As indicated above, any GDEs that may be affected significantly need to be clearly identified and the impacts quantified to enable proper assessment.

Surface Water

The Office of Water is responsible for the management of rivers, estuaries, wetlands and adjacent riverine plains so they can sustain environmental, social and economic uses for the people in New South Wales.

Watercourse/Riparian

The assessment is required to consider the impact of the proposal on the watercourses and associated riparian vegetation within the site and provide the following:

1. Identify the sources of surface water.
2. Details of stream order (using the Strahler System).
3. Details of any proposed surface water extraction, including quantity, purpose, location of existing pumps, dams, diversions, cuttings and levees.
4. Details of available surface water licences that could be purchased to account for any proposed extractions.
5. Detailed description of any proposed development or diversion works including all construction, clearing, draining, excavation and filling.
6. An assessment of the impacts of the proposed methods of excavation, construction and material placement on the watercourse and associated vegetation.
7. A detailed description of all potential water related environmental impacts of any proposed development in terms of riparian vegetation, sediment movement, water quality and hydrologic regime.
8. A description of the design features and measures to be incorporated into any proposed development to guard against anything more than minimal long term actual and potential environmental disturbances, particularly in respect of maintaining the natural hydrologic regime and sediment movement patterns and the identification of riparian buffers. (See note below)
9. Details of the impact on water quality and remedial measures proposed to address more than minimal adverse effects.

Riparian corridors form a transition zone between terrestrial and aquatic environments and perform a range of important environmental functions. The protection or restoration of vegetated riparian areas is important to maintain or improve the geomorphic form and ecological functions of watercourses through a range of hydrologic conditions in normal seasons and also in extreme events. Refer to NSW Office of Water *Guidelines for Controlled Activities (July 2012)* - available via: http://www.water.nsw.gov.au/Water-Licensing/Approvals/Controlled-activities/default.aspx

Water Management Structures/Dams

The Office of Water is responsible for the management and licensing of these structures under water legislation. If the proposal includes existing or proposed water management structures/dams, the assessment should provide information on the following:

(i) Date of construction (for existing structure/s).
(ii) Details of the legal status/approval for existing structure/s.
(iii) Details of any proposal to change the purpose of existing structure/s.
(iv) Details if any remedial work is required to maintain the integrity of the existing structure/s.
(v) Clarification if the structure/s is on a watercourse.
(vi) Details of the purpose, location and design specifications for the structure/s.
(vii) Size and storage capacity of the structure/s.
(viii) Calculation of the Maximum Harvestable Right Dam Capacity (MHRDC) for the site.
(ix) Details if the structure/s is affected by flood flows.
(x) Details of any proposal for shared use, rights and entitlement of the structure/s.
(xi) Details if the proposed development/subdivision has the potential to bisect the structure/s.

NSW Office of Water□s Farm Dams Assessment Guide provides details on harvestable rights and the calculation of the MHRDC. Refer to: *http://www.water.nsw.gov.au/Water-Licensing/Basic-water-rights/Harvesting-runoff/Harvesting-runoff/default.aspx*.

Basic Landholder Rights

The *WMA* identifies Basic Landholder Rights (BLRs) for access to water whereby landholders over an aquifer

or with river or lake frontage can access water for domestic (household) purposes or to water stock without the need for a water licence (although a works approval may still be required for a bore utilising BLR). Pipeline constructions and easements may therefore affect existing BLR users and therefore all potentially affected BLR users need to be identified and the impacts quantified.

Sustainable Water Supply

Competition for water in NSW is extremely high. With the commencement of each Water Sharing Plan (WSP), a long term average extraction limit has been established which constrains overall growth in extractions in an area. In these areas there are limited types of new licenses that can be issued, for example for aboriginal cultural purposes or growth in town water supplies. Therefore in most instances new enterprises are required to enter the water market to purchase adequate water licences to meet their water demand requirements.

The onus is on the proponent to identify the potential sources of water of an appropriate reliability and quantity to meet their water supply requirements. The water supply requirements and potential water available should be identified in the EIS to enable NOW to assess the viability of the water supply required. Assurances should also be made that the proponent will enter the water market as required.

Therefore the assessment is required to address the issue of provision of a sustainable water supply for any project proposal. The assessment should include Water Management Plans detailing how a sustainable water supply can be sourced and implemented. Through the implementation of BASIX, Integrated Water Cycle Management and Water Sensitive Urban Design, any proposed development should also exhibit high water use efficiency.

End Attachment B

Wayne Jones | Land Use Planning Coordinating Officer
Department of Primary Industries
Level 48, MLC Centre, 19 Martin Place Sydney NSW 2000
T:02 9338 6708 | E: wayne.jones@dpi.nsw.gov.au

NSW GOVERNMENT | Resources & Energy

PCU049707

File: OUT13/35049

25 November 2013

Alice Smith
Environmental Planning Officer, Mining Projects
Department of Planning & Infrastructure
GPO Box 39
Sydney NSW 2001

Dear Ms Smith

RE: Langley Heights (Oberon) Quarry – continued operations - DGRs request

Thank you for the opportunity to provide advice on this matter.

This is a response from NSW Trade & Investment, incorporating advice from its Agriculture, Fisheries, and Mineral Resources Branches. Specific Fisheries or Forests issues arising may be provided in separate correspondence.

Mineral Resources Issues
Hard rock aggregate is not a prescribed mineral under the Mining Act, 1992. Therefore, DTIRIS – Mineral Resources Branch has no statutory role in authorising or regulating the extraction of this commodity, apart from its role under the *Work Health & Safety Act 2011* and associated regulations and the Mine Health and Safety Act 2004 and associated regulations, for ensuring the safe operations of mines and quarries.

All environmental reports (EISs or similar) accompanying Development Applications for extractive industry lodged under the Environmental Planning & Assessment Act 1979 should include a resource assessment (as detailed in Attachment A) which:

- Documents the size and quality of the resource and demonstrates that both have been adequately assessed; and
- Documents the methods used to assess the resource and its suitability for the intended applications.

Applications to modify, expand, extend or intensify an existing consent that has already been adequately reported using the above protocol in publicly available documents, may restrict detailed documentation to the additional resources to be used, if accompanied by a summary of past resource assessments and of past production.

DTIRIS - Mineral Resources Branch collects data on the quantity and value of construction materials produced annually throughout the State. Forms are sent to all operating quarries at the end of each financial year for this purpose. The statistical data thus collected is of great value to Government and industry in planning and resource management, particularly as a basis for analysing trends in production and for

NSW Department of Trade and Investment, Regional Infrastructure and Services
RESOURCES & ENERGY DIVISION
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estimating future demand for particular commodities or in particular regions. In order to assist in the collection of construction material production data, the proponent should be required to provide annual production data for the subject site to DTIRIS - Mineral Resources Branch as a condition of any new or amended development consent.

Future requests for advice in relation to this matter should be directed to the MRB Land Use team at landuse.minerals@industry.nsw.gov.au.

Agricultural Issues for Extractive Industries (Quarries)

The relevant agricultural issues to consider when preparing and also when assessing extractive industry proposals are set out in the Departments' Guideline: *Agricultural issues for Extractive Industries* available on our website; http://www.dpi.nsw.gov.au/environment/landuse-planning/agriculture/extractive-industries. The guideline also documents recommended project design and mitigatory responses.

The guideline is part of a series designed to help consent authorities identify potential agricultural impacts, and assess whether such proposals can avoid conflict with existing agricultural developments; and protect valuable food and fibre production resources. The guidelines can similarly help consultants and proponents and are available from the Department of Primary Industries land use planning web portal: http://www.dpi.nsw.gov.au/environment/landuse-planning/agriculture .

Fisheries Issues

General issues are summarised in Attachment B.

Yours sincerely

Cressida Gilmore
Team Leader Land Use

Encl. Attachments "A to B"

NSW GOVERNMENT | Resources & Energy

ATTACHMENT A

TRADE & INVESTMENT NSW
RESOURCES & ENERGY DIVISION (Mineral Resources Branch)

ENVIRONMENTAL, and WORK HEALTH & SAFETY ASSESSMENT REQUIREMENTS FOR CONSTRUCTION MATERIAL QUARRY PROPOSALS

It is in the best interests of both the proponent and the community to fully assess the resources which are to be extracted. This means that a thorough geological assessment should be undertaken to determine the nature, quality and extent of the resource. Failure to undertake such an assessment could lead to operational problems and possibly even failure of the proposal.

The following issues need to be addressed when preparing an environmental assessment (EA) or environmental impact statement (EIS) for a proposed construction materials (extractive materials) quarry:

Resource Assessment

1. A summary of the regional and local geology including information on the stratigraphic unit or units within which the resource is located.

2. The amount of material to be extracted and the method or methods used to determine the size of the resource (e.g. drilling, trenching, geophysical methods). Plans and cross-sections summarising this data, at a standard scale, showing location of drillholes and/or trenches, and the area proposed for extraction, should be included in the EA or EIS. Relevant supporting documentation such as drill logs should be included or appended. Major resource proposals should be subject to extensive drilling programs to identify the nature and extent of the resource.

3. Characteristics of the material or materials to be produced:
   a) For structural clay/shale extraction proposals, ceramic properties such as plasticity, drying characteristics (e.g. dry green strength, linear drying shrinkage), and firing characteristics (e.g. shrinkage, water absorption, fired colour) should be described.
   b) For sand extraction proposals, properties such as composition, grainsize, grading, clay content and contaminants should be indicated. The inclusion of indicative grading curves for all anticipated products as well as the overall deposit is recommended.
   c) For hard rock aggregate proposals, information should be provided on properties such as grainsize and mineralogy, nature and extent of weathering or alteration, and amount and type of deleterious minerals, if any.

d) For other proposals, properties relevant to the range of intended uses for the particular material should be indicated.

Details of tests carried out to determine the characteristics of the material should be included or appended. Such tests should be undertaken by NATA registered testing laboratories.

4. An assessment of the quality of the material and its suitability for the anticipated range of applications should be given.

5. The amount of material anticipated to be produced annually should be indicated. If the proposal includes a staged extraction sequence, details of the staging sequence needs to be provided. The intended life of the operation should be indicated.

6. If the proposal is an extension to an existing operation, details of history and past production should be provided.

7. An assessment of alternative sources to the proposal and the availability of these sources. The impact of not proceeding with the proposal should be addressed.

8. Justification for the proposal in terms of the local and, if appropriate, the regional context.

9. Information on the location and size of markets to be supplied from the site.

10. Route(s) used to transport quarry products to market.

11. Disposal of waste products and the location and size of stockpiles.

12. Assessment of noise, vibration, dust and visual impacts, and proposed measures to minimise these impacts.

13. Proposed rehabilitation procedures during, and after completion of, extraction operations, and proposed final use of site.

14. Assessment of the ecological sustainability of the proposal.

Health and Safety Issues

In relation to the health & safety of mining and quarrying operations, the following issues should be addressed:

1. All operations are to comply with the following Acts & Regulations
    a. *Work Health & Safety Act 2011*
    b. Work *Health & Safety Regulations 2011*
    c. *Mine Health & Safety Act 2004*
    d. *Mine Health & Safety Regulations 2007*

2. The mine holder must nominate the mine operator in writing on the prescribed form to the Chief Inspector as required by the *Mine Health & Safety Act 2004* Section 22 prior to the commencement of extraction.

3. The operator of the mine must appoint a production manager as required by the *Mine Health & Safety Regulation 2007* Clause 16 and the operator must notify the Chief Inspector of the appointment in writing as required by the *Mine Health & Safety Regulation 2007* Clause 18 prior to the commencement of extraction.

4. Any blasting operations carried out by the mine operator must comply with the *Explosives Act 2003* and the *Explosives Regulations 2005*.

Mineral Ownership

The *Mining Act 1992* applies to those commodities prescribed by the regulations of the Act (Schedule 2, Mining Regulation 2003). Most construction materials are not prescribed minerals under the *Mining Act 1992*. In general terms, this means these materials are owned by the Crown where they occur on Crown land and by the landowner in the case of freehold land. A Mining Title is not required for their extraction although a Crown Lands licence is required where they occur on Crown land.

Construction materials such as s*and (other than marine aggregate), loam, river gravel, and coarse aggregate materials such as basalt, sandstone, and granite* are not prescribed minerals under the *Mining Act 1992*. Therefore, Trade & Investment NSW has no statutory responsibility for authorising or regulating the extraction of these commodities, apart from its role under the *Mine Health and Safety Act 2004* with respect to the safe operation of mines and quarries. However, the Department is the principal government authority responsible for assessing the State's resources of construction materials and for advising State and local government on their planning and management.

Some commodities, notably *structural clay (ie clay for brick, tile and pipe manufacture), dimension stone (except for sandstone), quartzite, kaolin, limestone and marine aggregate* are prescribed minerals under the *Mining Act 1992*. Minerals which are prescribed as minerals under the terms of the Mining Act may, in some cases belong either to the Crown or to the landowner, depending on a number of factors including the date on which the mineral was proclaimed and the date of alienation of the land. The proponent needs to determine whether the material is privately owned or Crown mineral (publicly owned). If it is privately owned, then either a notification under Section 8 of the Mining Act 1992 or, alternatively, a mining lease or mineral claim would be required. If it is a Crown mineral, an application for a mining lease or mineral claim will have to be lodged.

If you are unsure whether a mining title is required for your proposal you should contact NSW Trade & Investment, Resources & Energy Division.

NSW GOVERNMENT | Trade & Investment

ATTACHMENT B

Primary Industries Division - Aquatic Habitat Protection Requirements

Matters to be Addressed

Definitions

The definitions given below are relevant to these requirements:

Fish means any part of marine, estuarine or freshwater fish or other aquatic animal life at any stage of their life history (whether alive or dead). This includes aquatic molluscs, crustaceans, echinoderms, worms, aquatic insect larvae and other macroinvertebrates .

Marine vegetation means any species of plant that at any time in its life must inhabit water (other than fresh water).

Waters refers to all waters including tidal waters as well as flowing streams, irregularly flowing streams, gullies, rivers, lakes, coastal lagoons, wetlands and other forms of natural or man made water bodies on both private and public land.

1. General Requirements

- Area which may be affected either directly or indirectly by the development or activity should be identified and shown on an appropriately scaled map (1:25000) and aerial photographs.
- All waterbodies and waterways within the proposed area of development are to be identified.
- Description and maps of aquatic vegetation, snags, gravel beds and any other protected, threatened or dominant habitats should be presented. Description should include area, density and species composition.
- A survey of fish species should be carried out and results included. Existing data should be used only if collected less than 5 years previously.
- Identification of recognised recreational and commercial fishing grounds, aquaculture farms and/or other waterways users.
- Details of the location of all component parts of the proposal, including any auxiliary infrastructure, timetable for construction of the proposal with details of various phases of construction
- Aspects of the management of the proposal, both during construction and after completion, which relate to impact minimisation and site rehabilitation eg Environment Management Plans, Rehabilitation Plans, Compensatory offsets
- For each freshwater body identified on the plan, the plan should include, either by annotation or by an accompanying table, hydrological and stream morphology information such as: flow characteristics, including any seasonal variations, bed substrate, and bed width
- For each marine or estuarine area identified on the plan, the plan should include, either by annotation or by an accompanying table, hydrological and stream morphology information such as: tidal characteristics, bed substrate, and depth contours

DREDGING AND RECLAMATION ACTIVITIES

- Purpose of works
- Type(s) and distribution of marine vegetation in the vicinity of the proposed works
- Method of dredging to be used

- Timing and Duration of works
- Dimension of area of works including levels and volume of material to be extracted or placed as fill
- Nature of sediment to be dredged, including Acid Sulphate Soil, contaminated soils etc
- Method of marking area subject to works
- Environmental safeguards to be used during and after works
- Measures for minimising harm to fish habitat under the proposal
- Spoil type and source location for reclamation activities
- Method of disposal of dredge material
- Location and duration of spoil stockpiling, if planned

ACTIVITIES THAT DAMAGE MARINE VEGETATION

- Type of marine vegetation to be harmed
- Map and density distribution of marine vegetation
- Reasons for harming marine vegetation
- Methods of harming marine vegetation
- Construction details
- Duration of works/activities
- Measures for minimising harm to marine vegetation under the proposal and details of compensatory habitat development to replace lost vegetation.
- Method and location of transplanting activities or disposal of marine vegetation

ACTIVITIES THAT BLOCK FISH PASSAGE

- Type of activity eg works in a stream that change flow or morphological characteristics of the stream, including culvert and causeway construction, sediment and erosion control measures, stormwater diversion structures.
- Length of time fish passage is to be restricted, whether permanent or temporary
- Timing of proposed restriction. Should be timed to avoid interfering with migratory movements of fish.
- Remediation or compensatory works to offset any impacts

THREATENED SPECIES

- Threatened aquatic species assessment (Section 5c, EP&A Act 1979). This must be addressed even if there are no Threatened Species present on the site.
- Seven Part Test

FISHING AND AQUACULTURE

- Outline and document commercial, recreational and indigenous fishing activities that may be affected by the activity, including regular commercial fishing grounds, popular recreational fishing sites, recognised indigenous harvesting sites.
- Will the activity interfere with or cause an impact on the continuing operation and viability of nearby aquaculture or mariculture ventures.

2. Initial Assessment

A list of threatened species, endangered populations and endangered ecological communities must be provided. In determining these species, consideration must be given to the habitat types present within the study area, recent records of threatened species in the locality and the known distributions of these species.

In describing the locality in the vicinity of the proposal, discussion must be provided in regard to the previous land and water uses and the effect of these on the proposed site. Relevant historical events may include land clearing, agricultural activities, water

abstraction/diversion, dredging, de-snagging, reclamation, siltation, commercial and recreational activities.

A description of habitat including such components as stream morphology, in-stream and riparian vegetation, water quality and flow characteristics, bed morphology, vegetation (both aquatic and adjacent terrestrial), water quality and tide/flow characteristics must be given. The condition of the habitat within the area must be described and discussed, including the presence and prevalence of introduced species. A description of the habitat requirements of threatened species likely to occur in the study area must be provided.

In defining the proposal area, discussion must be provided in regard to possible indirect effects of the proposal on species/habitats in the area surrounding the subject site: for example, through altered hydrological regimes, soil erosion or pollution. The study area must extend downstream and/or upstream as far as is necessary to take all potential impacts into account.

Please Note: Persons undertaking aquatic surveys may be required to hold or obtain appropriate permits or licences under relevant legislation. For example:

Fisheries Management Act 1994
- Permit to take fish or marine vegetation for research or other authorised purposes (Section 37)
- Licence to harm threatened (aquatic) species, and/or damage the habitat of a threatened species (Section 220ZW).

Animal Research Act 1985:
- Animal Research Authority to undertake fauna surveys.

It is recommend that, prior to any field survey activities taking place, those persons proposing to undertake those activities give consideration to their obligation to obtain appropriate permits or licences which may be required in the specific context of the proposed survey activities.

3. Assessment of Likely Impacts

The EIS must:
- describe and discuss significant habitat areas within the study area;
- outline the habitat requirements of threatened species likely to occur in the study area;
- indicate the location, nature and extent of habitat removal or modification which may result from the proposed action;
- discuss the potential impact of the modification or removal of habitat;
- identify and discuss any potential for the proposal to introduce barriers to the movement of fish species; and
- describe and discuss any other potential impacts of the proposal on fish species or their habitat.

For all species likely to have their lifecycle patterns disrupted by the proposal to the extent that individuals will cease to occupy any location within the subject site, the EIS must describe and discuss other locally occurring populations of such species. The relative significance of this location for these species in the general locality must be discussed in terms of the extent, security and viability of remaining habitat in the locality.

4. Ameliorative Measures

The EIS must consider how the proposal has been or may be modified and managed to conserve fisheries habitat on the subject site and in the study area.

In discussing alternatives to the proposal, and the measures proposed to mitigate any effects of the proposal, consideration must be given to developing long term management strategies to protect areas within the study area which are of particular importance for fish species. This may include proposals to restore or improve habitat.

Any proposed pre-construction monitoring plans or on-going monitoring of the effectiveness of the mitigation measures must be outlined in detail, including the objectives of the monitoring program, method of monitoring, reporting framework, duration and frequency.

In the event of a request for concurrence or consultation of the Director of Industry & Investment NSW, one (1) copy of the EIS should be provided to Industry & Investment NSW in order for the request to be processed.

It should be noted that Industry & Investment NSW has no regulatory or statutory role to review draft EISs unless they are accompanied by or are requested as part of a licence application under Part 7A of the FM Act. However, Industry & Investment NSW is available to provide advice to consent and determining authorities regarding Fisheries' opinion as to whether the requirements have been met if requested, pending the availability of resources and other statutory priorities.

Useful Information

To help you in the preparation of an EIS, the publication "*Guidelines for the Assessment of Aquatic Ecology in EIA*" (Draft 1998) produced by the Department for Urban Affairs and Planning may prove useful in outlining appropriate procedures and methodologies for conducting aquatic surveys.

Should you require any further information on these requirements please contact the Aquatic Habitat Protection Office at Port Stephens on 4916 3931.

Transport
Roads & Maritime
Services

WST13/00140

The Manager
Mining Projects
Department of Planning & Infrastructure
GPO Box 39
SYDNEY NSW 2001

Attention: Ms Alice Smith

Dear Ms Smith

Langley Heights Quarry; Continued Operations Project
Request for input into Director-General's Requirements (DGRs)

Thank you for your email on 15 November 2013 requesting input into DGRs for the continued operations of Langley Heights Quarry from Roads and Maritime Services. The key concern for Roads and Maritime Services is potential for impacts upon the safety and efficiency of the classified road network.

Roads and Maritime has identified the following key issues which need to be addressed in the Environmental Assessment being prepared in support of the project:

- A traffic impact study prepared in accordance with the methodology set out in Section 2 of the *RTA Guide to Traffic Generating Developments* and including:
    - road transport volumes and types broken down into origin and destination, travel routes, times of travel, peak vehicle movements and how proposed operations will interact with other road users. The study should provide details of projected transport operations including volumes of traffic and tonnage to be transported. Volumes should also include quarry input related traffic generation (e.g. fuel deliveries, potable water deliveries, maintenance, services) and impacts of quarry related traffic generation on public roads. The traffic study should address internal traffic movements and parking facilities;
    - any oversize and over-mass vehicles and loads expected for the construction, operation or decommissioning of the project;
    - temporary and permanent staff numbers (including employees and contractors) during construction and operation of the project;
    - the impact of generated traffic and measures employed to ensure efficiency and safety on the public road network during construction and operation of the project;
    - local climate conditions that may affect road safety for vehicles used during construction and operation of the project (e.g. dust, fog, wet weather, etc).

Roads and Maritime Services

51-55 Currajong St Parkes NSW 2870
PO Box 334 Parkes NSW 2870
www.rms.nsw.gov.au | 13 22 13

- Proposed intersection treatments should be identified and be in accordance with *Austroads Guide to Road Design 2010* and Roads and Maritime Supplements, including safe intersection sight distance;
- Details of required infrastructure works to support any increased demand on the road network as a result of the project.

Roads and Maritime appreciates the opportunity to contribute to the DGRs and requests that a copy of the DGRs be forwarded to Roads and Maritime at the same time they are sent to the applicant.

Should you require further information please contact Fiona Francis on (02) 6861 1688.

Yours faithfully

5 DEC 2013

Tony Hendry
Network & Safety Manager
Western

APPENDIX 3

Noise Impact Assessment

umwelt

Inspired people | Dedicated team
Quality outcomes

OBERON QUARRIES

Noise Impact Assessment

October 2014

OBERON QUARRIES

Noise Impact Assessment

October 2014

Prepared by
Umwelt (Australia) Pty Limited

on behalf of
Oberon Quarries Pty Limited

Project Director:	**Peter Jamieson**
Project Manager:	**Peter Jamieson**
Report No.	**1296/R26/FINAL**
Date:	**October 2014**

Newcastle

75 York Street
Teralba NSW 2284

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Executive Summary

Oberon Quarries Pty Limited has operated a hard rock quarry at 'Langley Heights' (Oberon Quarry) since 1995. The development consent, granted by the Minister for Planning is due to lapse on 13 May 2016. In order to improve efficiency and environmental performance of the quarry operations and further the life of the quarry for extraction of proven reserves, Oberon Quarries is seeking consent to extend the life of the quarry DA 92/164 under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for an additional 30 years.

The Project represents the continuation of the existing quarry operations, which will remain substantially the same. As a part of the Project, Oberon Quarries proposes to replace some of the existing crushing and screening plant with modern plant, which is more energy efficient, produces less fines (a by-product of the crushing process) and results in an overall reduction in the environmental impacts of the operation. All other aspects of the approved quarry processing operations will remain unchanged. There are a number of other environmental improvements proposed however none of these will cause any significant change to noise levels or noise impacts from quarry operations.

Section 10 – Applying the policy to existing industrial premises of the Industrial Noise Policy (INP) (Environment Protection Agency (EPA) 2000) deals with application of the INP (EPA, 2000) to existing industrial noise sources such as Oberon Quarry. The approach established by the EPA in 2000 was designed to allow established industries to adapt to changes in the noise expectations of the community while remaining economically viable.

The methodology for the assessment of the noise impacts from Oberon Quarry is based on the requirements of Section 10 of the INP (EPA, 2000). Specifically the INP (EPA, 2000) notes that the project-specific noise levels (PSNL) identified for the Project should not be applied as mandatory noise limits but provide initial target levels that drive the process of assessing all feasible and reasonable control measures for the Project.

To satisfy the requirements of the relevant policies and guidelines, the Noise Impact Assessment (NIA) has:

- identified noise sensitive locations likely to be affected by activities at the site and estimated the existing background and amenity noise levels at representative locations;
- determined the target PSNLs for the Project based on the estimation of the underlying background and amenity noise levels of the surrounding receiver areas;
- identified all noise sources from the Project and determined the expected noise levels and noise characteristics likely to be generated from the noise sources;
- identified the times of operation of the Project and all related noise producing activities;
- determined the noise levels likely to be received at the most sensitive locations using an approved predictive noise model:
  - under neutral calm conditions;
  - gradient winds identified as being significant in accordance with the INP (EPA, 2000); and

    under temperature inversions;
- compared the predicted noise levels with the target PSNLs determined for the Project in accordance with Section 10 of the INP (EPA, 2000);

- discussed the findings from the predictive noise model and determined the achievable project noise levels that would form the basis of project-specific noise criteria in accordance with the requirements of Section 10 of the INP (EPA 2000); and

- provided details of the recommended noise monitoring program to be undertaken at noise sensitive locations for the duration of the Project.

The computer-based modelling software package Environmental Noise Model (ENM) was used to predict the noise levels produced by the Project in the surrounding environment.

Without control measures in place ongoing operation of Oberon Quarries could result in noise levels exceeding the target PSNLs of 35 dB(A) in the region surrounding the Project. Control measures that have been considered as a part of the ongoing operation of Oberon Quarries include:

- maintenance of the existing equipment and associated sound attenuation features;

- increasing the height of the earth-berm situated adjacent to the process plant area;

- attenuation of the crushing and screening plant;

- locating processing equipment or part thereof within the quarry area; and

- restricting operational speeds of the road haulage trucks as they enter and leave the site.

As a part of the development, Oberon Quarries is proposing to replace some of the existing crushing and screening plant and include an additional cone crusher. The replacement/new crushing and screening plant will be more energy efficient, produce fewer fines and result in an overall reduction in the environmental impacts of the operation. Oberon Quarries is also proposing to utilise a Finlay 150E Hydrasander or equivalent on the quarry floor to produce manufactured sand from 5 mm minus material. The screen/dewaterer will be located in an acoustically shielded position. While all other aspects of the existing quarry remain unchanged the purchase of replacement/new crushing and screening plant provides an opportunity to install equipment with lower overall sound power.

The quarry has been operating without noise complaints for many years however has been generating noise levels under certain non-significant meteorological conditions in excess of the target PSNL of 35 dB(A). Inclusion of new crushing and screening plant is estimated to reduce the existing noise at the nearby residential receivers by 3 dB to 6 dB when compared to the current operations.

Modelling indicates that during the day, evening and night time period noise levels will not exceed the target PSNL of 35 dB(A) under calm conditions or under conditions associated with significant wind conditions as defined by the INP (EPA, 2000) at all surrounding residences except for the following:

- Under non-significant 3 m/s westerly winds noise levels of up to 41 dB(A) may be experienced at Location 1 (Hackfath) during quarry operations and 42 dB(A) during quarry operations and product dispatch. This is a 1 dB reduction in noise levels from existing operations under the same non-significant wind conditions. Mr Hackfath has stated that he does not find existing noise levels intrusive.

- Under temperature inversion conditions with a 2 m/s southerly drainage flow product dispatch on the private quarry haul road during evening and night time periods could result in noise levels of 38 dB(A) at Location 5 (Langley Heights). It is noted there is a commercial agreement between Oberon Quarries and the owner of Location 5.

The INP (EPA, 2000) notes that when predicted noise levels exceed the target PSNL a range of strategies should be considered to reduce the noise impact on offsite receivers. The three main strategies for noise control are:

- controlling noise at the source;
- controlling the transmission of noise; and
- controlling noise at the receiver.

If unacceptable noise impacts from a development persist after noise mitigation action has been undertaken, Section 8 and Section 10 of the INP (EPA, 2000) provide a process for negotiating an agreement between the proponent and the affected party(s). One of the outcomes from this process is to set project-specific noise criterion for the Project that allows Oberon Quarries to adapt to changes in the noise expectations of the community while remaining economically viable. The project-specific noise criterion would be based on the noise levels achievable following the implementation of the identified reasonable and feasible controls measures. Normally the project-specific noise criterion relates to the noise impacts associated with worst case meteorological conditions identified as significant, as defined by the INP (EPA, 2000). For property Location 1 – Hackfath the achievable project-specific noise criterion needs to also consider non-significant meteorological conditions.

The predicted received $L_{A1,1minute}$ noise levels associated with the ongoing night time activities meet the recommended sleep disturbance noise goals at all residential receivers. The predicted noise levels that approach the recommended sleep disturbance noise goal are specifically associated with the product trucks entering and leaving the site.

The assessment of the road traffic noise impact indicates the predicted road traffic noise levels associated with product trucks travelling to or from Oberon Quarries' operation do not exceed the day and night time road traffic noise criteria outlined in the NSW *Road Noise Policy* (DECCW, 2011).

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APPENDICES

1.0 Introduction

Oberon Quarries Pty Limited (Oberon Quarries) has been producing crushed aggregates from a hard rock quarry at 'Langley Heights' (Oberon Quarry), approximately 4 km south of Oberon since 1995 (refer to **Figure 1.1**). Development consent for the quarry was granted subject to a range of conditions, on 1 October 1993 by the Minister for Planning, following a Commission of Inquiry.

Development consent (DA 92/164) for the quarry was originally granted (subject to a range of conditions) on 1 October 1993 by the Minister for Planning, following a Commission of Inquiry. The consent has been modified five times with the most recent modification extending the consent timeframe to 13 May 2016 (MOD 5).

In order to improve efficiency and environmental performance of the quarry operations and further the life of the quarry for extraction of proven reserves, Oberon Quarries is seeking consent to extend the life of the quarry DA 92/164 under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for an additional 30 years. The Project is declared to be a State Significant Development under the provisions of the State Environmental Planning Policy (State and Regional Development) 2011, and the Minister for Planning will be the consent authority for the development.

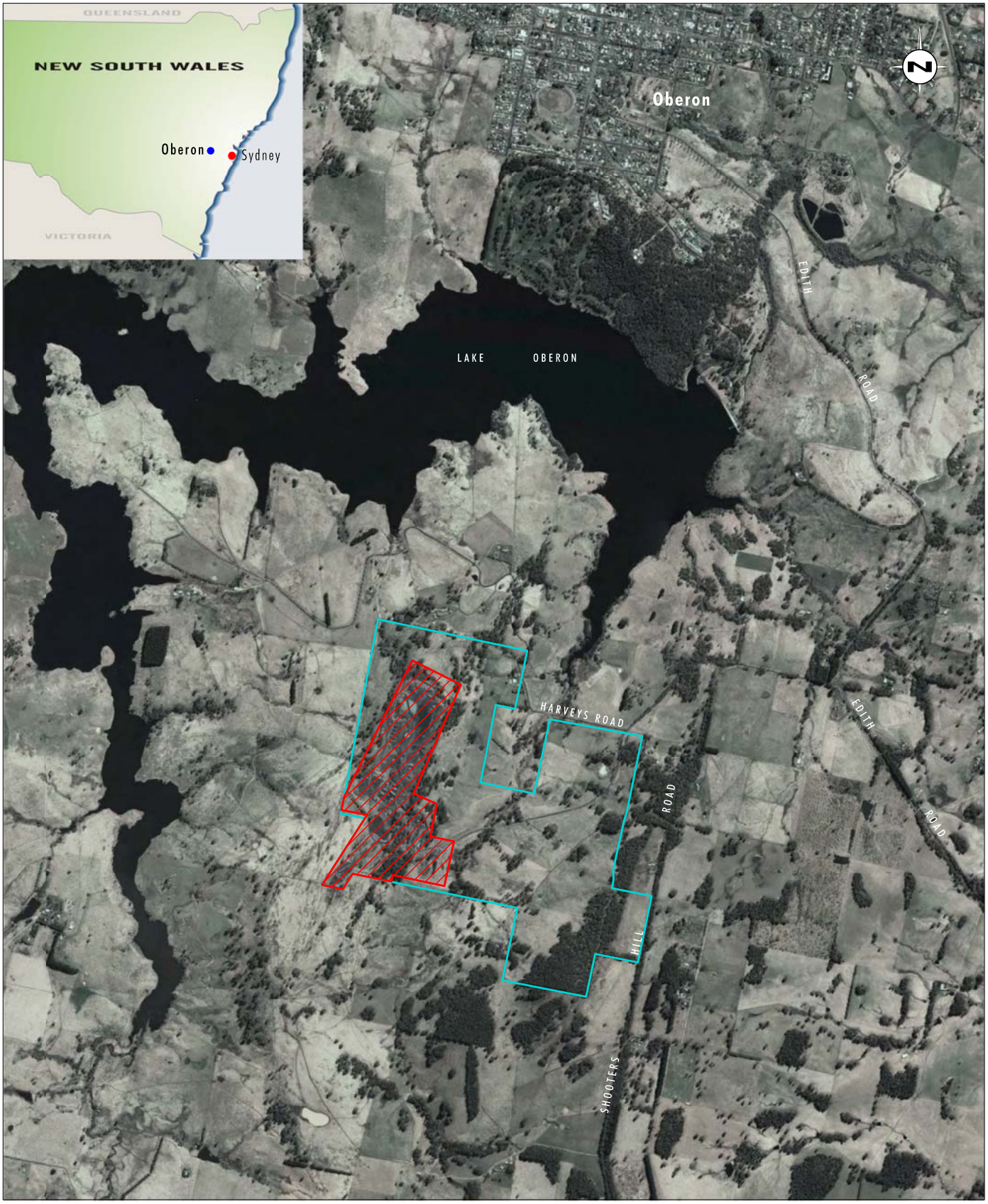
The Project represents the continuation of the existing quarry operations, which will remain substantially the same. As a part of the Project, Oberon Quarries proposes to replace some of the existing crushing and screening plant with modern plant, which is more energy efficient, produces less fines (a by-product of the crushing process) and results in lesser environmental impacts. Oberon Quarries also proposes to use a Finlay 150E Hydrasander or equivalent within the rim of the extraction area to produce manufactured sand from the 5 mm minus material. All other aspects of the approved quarry processing operations will remain unchanged.

This Noise Impact Assessment (NIA) has been prepared by Umwelt (Australia) Pty Limited in support of the development Application and Environmental Impact Statement (EIS) for the Project.

1.1 Project Description

1.1.1 Hours of Operation

The approved hours of operation at Oberon Quarry are dependent on the activity being undertaken and are detailed in **Table1.1**.



Source: Google Earth (2012)

0 0.5 1.0 1.5km

1:30 000

Legend

Project Area

Langley Heights Property

FIGURE 1.1

Locality Map

Table 1.1 – Approved Hours of Operation

Activity	Approved Hours of Operation
Quarrying and Processing Areas	7.00 am to 6.00 pm, Mondays to Fridays 7.00 am to 5.00 pm, Saturdays No quarrying or processing shall be undertaken on Sundays or public holidays.
Loading Haul Trucks	6.00 am to 10.00 pm, Mondays to Fridays 6.00 am to 5.00 pm, Saturdays No loading of haul trucks shall be undertaken on Sundays or public holidays.
Product Delivery	6.00 am to 10.00 pm, Mondays to Fridays 6.00 am to 5.00 pm, Saturdays No product delivery trucks are to enter the quarry prior to 6.00 am on any day. During the periods 6.00 am to 7.00 am and 6.00 pm to 10.00 pm a maximum of 4 laden delivery trucks shall leave the site per hour (total 8 truck movements per hour).
Construction of Haul Road and Quarry Infrastructure	7.00 am to 6.00 pm Mondays to Fridays 7.00 am to 4.00 pm Saturdays No construction shall be undertaken on Sundays or public holidays.
Maintenance	7.00 am to 6.00 pm Mondays to Fridays 7.00 am to 4.00 pm Saturdays.

1.2 Land Use and Ownership

The quarry is located in cleared land that is used for sheep and cattle grazing. Pasture in the area is mainly improved.

The location of the private residences and residences owned by Oberon Quarries or associated with Oberon Quarries are shown on **Figure 1.2**.

Image Source: Google Earth (2012)

0 0.25 0.5 1.0km
1:20 000

Legend

- Noise Monitoring Location
- Residential Receiver Location
- Residence Owned by Oberon Quarries or Associated with Quarry

FIGURE 1.2

Noise Monitoring and Residential Receiver Locations

2.0 Statutory Noise Requirements

2.1 Section 10 of the Industrial Noise Policy

Section 10 – Applying the policy to existing industrial premises of the Industrial Noise Policy (INP) (Environment Protection Authority (EPA), 2000) deals with application of the INP (EPA, 2000) to existing industrial noise sources such as Oberon Quarry. The approach established by the EPA in 2000 was designed to allow established industries to adapt to changes in the noise expectations of the community while remaining economically viable.

The INP (EPA, 2000) identifies four triggers for the application of Section 10. These are:

- the site becomes the subject of serious and persistent noise complaints;
- there is a proposal to upgrade and/or expand the site;
- the site has no formal consent or licence conditions and management wish to clarify their position; and
- management chooses to initiate a noise reduction program.

Using theses triggers as a guide, the methodology for the preparation of the NIA has taken into account:

1. Oberon Quarry is not the subject of noise complaints from the community or Office of Environment and Heritage (OEH).

2. As discussed in **Section 1.0**, the preparation of the EIS and supporting studies is to enable assessment of the proposed continuation of the existing quarry operations. The operations at the quarry will remain substantially the same. However, the Project will include some minor 'upgrade and/or expansion' to the site to account for changes/improvements in operating practices, equipment selection and product quality/demand.

3. The existing development consent for Oberon Quarries was granted in 1993. As a result, the management of the noise impacts is based around the expectation of the *Environmental Noise Control Manual* (EPA, 1985). In support of the development application for the continued operation of the quarry, Oberon Quarries will need to establish contemporary noise criteria for the site in accordance with the INP (EPA, 2000).

4. Based on Point 3 above, Oberon Quarries recognises that the quarry may not achieve contemporary project-specific noise levels as defined by the INP (EPA, 2000). However, Section 10 of the INP (EPA, 2000) notes that:

    - the project-specific noise levels (PSNL) should not be applied as mandatory noise limits;
    - the PSNLs supply the initial target levels and drive the process of assessing all feasible and reasonable control measures;
    - achievable noise limits result from applying all feasible and reasonable noise control measures; and
    - for a number of sites the achievable noise limits may sometimes be above the PSNL.

As noted in the INP (EPA, 2000), should there be noise complaints, the site may need to reduce its noise emissions progressively to achieve target project specific noise limits. Such

measures are typically set out in a noise reduction program attached as a licence condition to the sites Environment Protection Licence (EPL).

Section 10 of the INP (EPA, 2000) outlines a methodology for the assessment of a project where a company proposes to upgrade or modify its existing operations. This methodology, outlined in **Section 2.2**, is also applicable to a proposal for the continuation of an existing operation where the proponent wishes to clarify its position with respect to the expectation of the INP (EPA, 2000).

With respect to the methodology outlined in **Section 2.2**, the PSNLs determined from the assessment of the underlying background and amenity noise levels in the receiver areas surrounding the Project, are not mandatory noise limits. The PSNLs provide the initial target levels that drive the process for assessing feasible and reasonable control measures. The achievable noise limits result from applying all feasible and reasonable control measures to the operation.

2.2 Methodology

To satisfy the requirements of the relevant policies and guidelines, this NIA has:

- identified noise sensitive locations likely to be affected by activities at the site and estimated the existing background and amenity noise levels at representative locations in accordance with the INP (EPA, 2000) (refer to **Section 3.0**);
- determined the target PSNLs for the Project based on the estimation of the underlying background and amenity noise levels of the surrounding receiver areas (refer to **Section 3.0**);
- identified all noise sources from the Project and determined the expected noise levels and noise characteristics (e.g. tonality, impulsiveness, etc.) likely to be generated from the noise sources (refer to **Section 5.0**);
- identified the times of operation of the Project and all related noise producing activities (refer to **Section 1.0** and **Section 4.0**);
- determined the noise levels likely to be received at the most sensitive locations under neutral meteorological conditions and relevant gradient winds (refer to **Section 5.0**);
- considered the influence of existing meteorological conditions such as wind and temperature inversions in the predictive noise model so as to provide a true representation of actual noise levels (refer to **Sections 4.0**, **5.0** and **6.0**);
- compared the predicted noise levels with the target PSNLs determined for the Project (refer to **Section 5.0**). The assessment of the predicted noise levels against PSNL was undertaken in accordance with Section 10 of the INP (EPA, 2000) (refer to **Section 2.0**);
- discussed the findings from the predictive noise modelling and, where predicted noise levels exceeded the relevant PSNL, recommended additional mitigation measures to be applied to the Project (refer to **Sections 5.0** and **6.0**);
- determined the achievable project noise levels that would form the basis of project-specific noise criteria in accordance with the requirements of Section 10 of the INP (EPA, 2000) (refer to **Sections 3.0**, **5.0**, **6.0** and **7.0**); and

- provided details of the recommended noise monitoring program to be undertaken at noise sensitive locations (subject to the agreement of the owners/occupiers) for the duration of the Project.

The computer-based modelling software package Environmental Noise Model (ENM) was used to predict the noise levels produced by the Project in the surrounding environment. The ENM noise models were based on machine and plant sound power level data obtained from Oberon Quarries or collected by Umwelt, digital terrain maps of the region surrounding the Project prepared by Umwelt and the layout of the existing and proposed operations provided by Oberon Quarries.

The NIA was based on the noise levels predicted by the ENM model of the existing and proposed operations. The predicted noise levels from the existing operation were compared with the noise monitoring results obtained for the existing operation. This information was used to validate the ENM model of the existing operation and assess the effects of meteorological conditions (primarily wind speed and wind direction).

The assessment of the predicted noise levels against PSNLs was then undertaken in accordance with Section 10 the INP (EPA, 2000). Where it was found that the predicted noise levels noise exceeded the respective PSNLs, appropriate mitigation measures were investigated. The results of this investigation are presented in **Section 5.0**.

A glossary of terms and abbreviations used in this report is provided in **Appendix A**.

The noise modelling and assessment process is described in **Sections 3.0** through **5.0**. A detailed summary of the INP (EPA, 2000) assessment methodology used for this NIA is provided in **Appendix B**.

3.0 Existing Acoustic Environment and Assessment Criteria

3.1 Existing Noise Environment

Due to the rural nature of the area surrounding the Project it can be reasonably assumed that the existing background level is at or below 30 dB(A). In addition to this, there are no other industrial noise sources in the area surrounding the Project. Therefore the existing industrial $L_{Aeq, period}$ (where period is day, evening or night) noise levels is more than 10 dB below the Acceptable Noise Level as defined by the INP (EPA, 2000).

3.2 Intrusiveness and Amenity Criteria

3.2.1 Application of the Industrial Noise Policy

The INP (EPA, 2000) has two components for the assessment of industrial noise sources, intrusive noise impacts and noise amenity levels. When assessing the noise impact of industrial sources both components are considered for residential receivers.

The PSNL reflects the most stringent noise levels derived from both the intrusive and amenity criteria. Where the intrusive criteria is less than or equal to the amenity criteria, the intrusive criteria is applied as the limiting criterion and forms the PSNL for the industrial source as it is more stringent due to being determined over a much shorter period of time. Where the predicted amenity noise level is lower than the intrusive level, both the intrusive and amenity noise limits become the limiting criteria and form the PSNL for the industrial source.

PSNL set the benchmark against which noise impacts and the need for noise mitigation are assessed. For existing operations the PSNL are not mandatory but supply the initial target levels that are used to derive the achievable noise limits based on the implementation of feasible and reasonable control measures.

When setting the PSNL, the INP (EPA, 2000) recommends the application of the most stringent requirement so that the applicable PSNL both limits intrusive noise and protects noise amenity. The PSNL derived for the Project are provided in **Section 3.3** and the achievable noise limits are discussed in **Section 7.0**.

3.2.2 Intrusiveness Criteria

Where the existing background level in the region surrounding the Project is at or below 30 dB(A) the corresponding Intrusiveness Criteria would be 35 dB(A). This is the minimum possible intrusiveness criterion under the INP (EPA, 2000).

3.2.3 Amenity Criteria

To limit continuing increases in noise levels due to industrial development, the INP (EPA, 2000) has identified maximum ambient noise levels for typical receiver areas and land uses. The recommended acceptable and maximum amenity noise levels for a rural environment are provided in **Table 3.1**. The Amenity Criteria is then determined by comparing the existing ambient noise levels resulting from industrial noise sources with the recommended acceptable ambient noise levels (Tables 2.1 and 2.2 in the INP (EPA, 2000) are reproduced in **Appendix B**).

Table 3.1 – Amenity Criteria – Recommended L_{Aeq} Noise Levels from Industrial Noise Sources, dB(A)

Type of Receiver	Indicative Noise Amenity Area	Time of Day [1] (Period)	Recommended L_{Aeq} Noise Level	
			Acceptable	Recommended Maximum
Residence	Rural	Day	50	55
		Evening	45	50
		Night	40	45

Note: 1 For Monday to Saturday, Day-time 7.00 am – 6.00 pm; Evening 6.00 pm – 10.00 pm; Night-time 10.00 pm – 7.00 am. On Sundays and Public Holidays, Day-time 8.00 am – 6.00 pm; Evening 6.00 pm – 10.00 pm; Night-time 10.00 pm–8.00 am.

Where the existing industrial $L_{Aeq, period}$ (where period is day, evening or night) noise levels is more than 10 dB below the Acceptable Noise Level referred to in **Table 3.1**, the Amenity Criteria is set at the Acceptable Noise Level. That is, the amenity criterion would be:

- 40 dB(A) for product truck loading and haulage on the private access road prior to 7.00 am (8.00 am Sunday);
- 50 dB(A) for the operation of the quarry and product truck loading during the day time (7.00 am – 6.00 pm Monday to Saturday, 8.00 am – 6.00 pm Sunday); and
- 45 dB(A) for product truck loading during the evening period (6.00 pm – 10.00 pm).

3.3 Project-specific Noise Levels

The PSNL reflects the most stringent noise levels derived from both the intrusive and amenity criteria and would be 35 dB(A) $L_{Aeq,15minute}$ for the day, evening and night-time periods.

3.4 Sleep Disturbance Criteria

The EPA notes that the INP (EPA, 2000) does not specifically address sleep disturbance from high noise level events and has provided an Application Notes (EPA June 2013), which references the review of research on sleep disturbance published in the NSW Road Noise Policy (DECCW, 2011). The INP Application Notes suggests that to prevent sleep disturbance, the $L_{A1,1\ minute}$ or $L_{A\ max}$ level of a noise source should not exceed the L_{A90} background noise level by more than 15 dB when measured outside the bedroom window. The INP Application Notes further explains that other factors are also important in assessing the extent of impact on sleep and, 'that where the criterion is met, sleep disturbance is not likely, but where it is not met, a more detailed analysis is required'.

The sleep disturbance criteria for all identified noise sensitive locations is 45 dB(A).

The INP Application Notes state that the sleep disturbance criteria are normally assessable for the night time period only (10:00 pm to 7:00 am).

3.5 Construction Noise Criteria

There is no proposed construction activities associated with the Project.

3.6 Road Traffic Noise Criteria

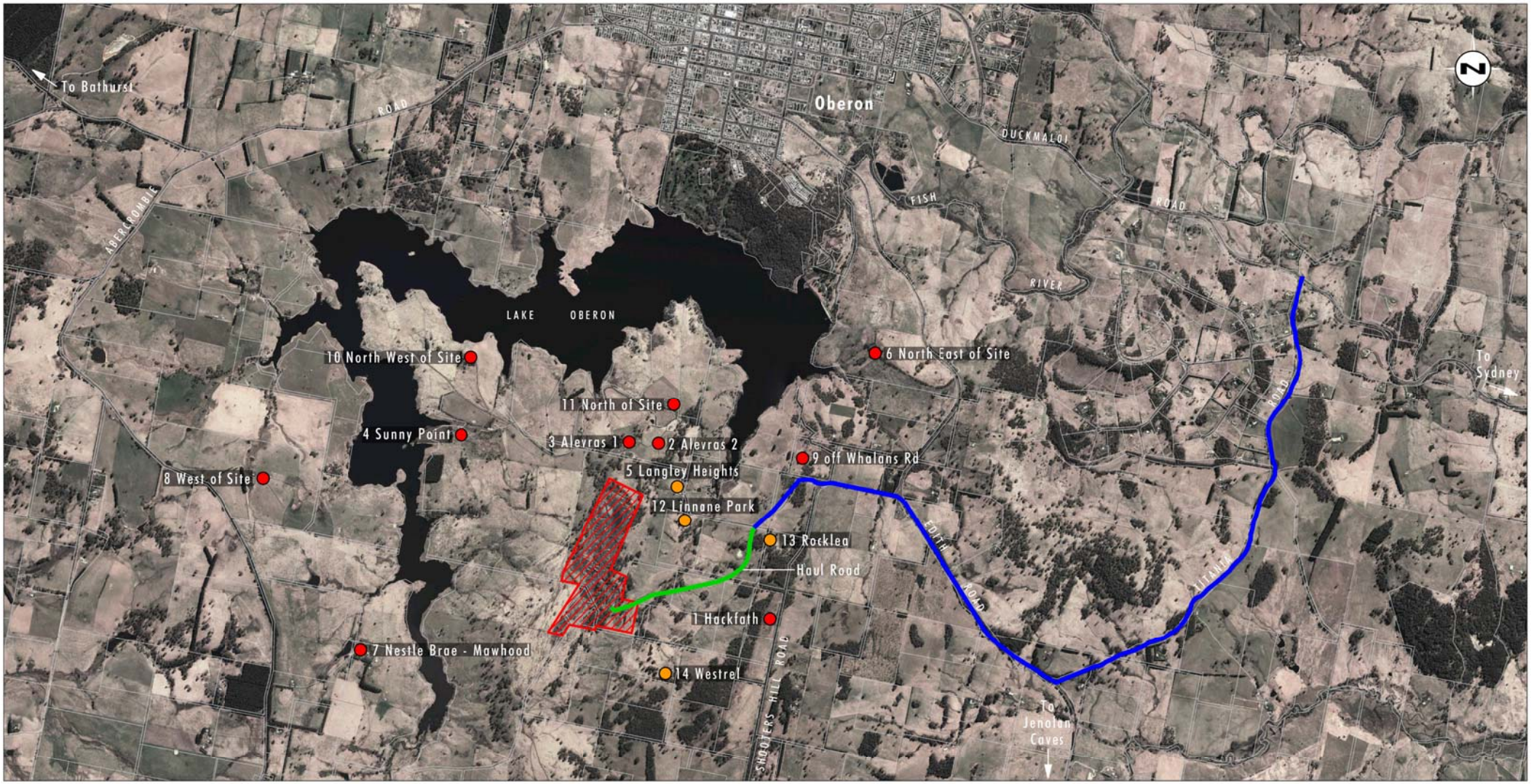
The DECCW's (now OEH's) *NSW Road Noise Policy* (DECCW, 2011) sets out criteria for road traffic noise through the provision of a framework that addresses traffic noise issues associated with new developments, new or upgraded road developments or planned building developments. While the proposed Project represents a continuation of existing operations, in keeping with the expectations of Section 10 on the INP (EPA, 2000), the road traffic noise from the existing operations have been assessed against the expectation of the *NSW Road Noise Policy* (DECCW, 2011).

Table 3.2 outlines the criteria relevant for the two way traffic volumes due to the Project along Oberon Quarry Road, Shooters Hill Road, Edith Road and Titania Road, the primary access route to Oberon Quarries (refer **Figure 3.1**). Product trucks on the quarry access road are assessed as industrial noise sources associated with the quarry.

Table 3.2 – Road Noise Criteria, dB(A)

Road Category	Type of Project/ Land use	Assessment criteria – dB(A)	
		Day (7 am – 10 pm)	Night (10 pm – 7 am)
Freeway/arterial/sub-arterial roads (i.e. Edith Road and Titania Road)	Existing residences affected by noise from new freeway/arterial/sub-arterial road corridors	$L_{Aeq, (15\ hour)}$ 55 (external)	$L_{Aeq, (9\ hour)}$ 50 (external)
	Existing residences affected by noise from redevelopment of existing freeway/arterial/sub-arterial roads	$L_{Aeq, (15\ hour)}$ 60 (external)	$L_{Aeq, (9\ hour)}$ 55 (external)
	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments		
Local roads (i.e. Shooters Hill Road)	Existing residences affected by noise from **new** local road corridors	$L_{Aeq, (15\ hour)}$ 55 (external)	$L_{Aeq, (9\ hour)}$ 50 (external)
	Existing residences affected by noise from **redevelopment** of existing local roads		
	Existing residences affected by **additional traffic** on existing local roads generated by land use developments		

Source: *NSW Road Noise Policy* (DECCW, 2011)



Source: Resource Planning (1992)

Legend

- Project Area
- Private Haul Road
- Haulage Route on Public Roads
- Residential Receiver Location
- Residence Owned by Oberon Quarries or Associated with Quarry

FIGURE 3.1

Product Delivery Road Transport Route

4.0 Modelling Parameters

4.1 Prediction of Projected Noise Levels

Section 6 of the INP (EPA, 2000) requires the prediction of noise levels taking into account all possible noise sources that may reasonably be expected when the plant or facility in question is fully operational. The schedule of equipment (or their equivalent) that the quarry will normally use is described in **Section 4.2**. The ENM model has been prepared assuming that all the equipment available is operational for durations of time representative of typical operational scenarios. Sources were located in representative locations based on typical quarry operations and product dispatch.

A number of operational scenarios were modelled to determine the worst-case operational noise impacts from the ongoing operation of the quarry. The components of the operational scenarios that were included in the noise assessment were:

1. Full operation of the process plant (crush and screening, and stockpiling product); and
2. Quarrying activities occurring in the northern extension of the pit; or
3. Quarrying activities occurring in the southern extension of the pit; and
4. Loading of product trucks; and
5. Product trucks on the quarry access road.

It is understood that the loading and dispatch of product trucks as a stand-alone activity represents the worst-case scenario for evening and night-time activities as quarrying activities and operation of the process plant would only occur during the daytime.

4.2 Operational Noise Sources

Noise source models were prepared to represent the type of equipment currently in use at Oberon Quarries. Throughout the life of the Project equipment with the sound power levels (SWL) outlined in **Table 4.1**, or the equivalent, will be in use around the project area.

Table 4.1 – Modelled Equipment SWL, dB(A)

Equipment	SWL, dB(A)
Product dispatch truck	110
Haul truck – CAT 769C	114
Excavator – CAT 330L	105
Excavator – CAT 345B	108
Dozer – CAT D8N	110
Finlay 150E Hydrasander	115
Front End Loader – CAT 980H	111
Quarry Processing Plant	116

4.3 Road Traffic Noise

The road noise impacts associated with traffic movements generated by the Project were modelled using the *U.S. Federal Highway Administration (FHWA) Traffic Noise Model (TNM) Version 2.5 Look-Up Tables* (U.S. Department of Transportation, 2004). TNM is a highway traffic noise prediction and analysis model used to analyse highway geometries including vehicle speeds, vehicle type, setback distances and the effectiveness of barriers.

Trucks travelling from Oberon Quarries to Western Sydney and Oberon utilise the private haul road, which connects to Oberon Quarry Road and then Shooters Hill Road, Edith Road and Titania Road, which form part of the public main road system. Sydney and Oberon bound trucks then travel via Titania Road, which is a designated heavy vehicle road, and then via Duckmaloi Road in the direction of either Sydney or Oberon township.

The road traffic noise impacts were modelled at set back distances of 60 m, 110 m and 250 m from the centre line of Oberon Quarry Road, Shooters Hill Road, Edith Road and Titania Road which represent the minimum, tenth percentile and average set back distance along the road transport route used to distribute product from the quarry.

4.4 Receivers

The Single Point Calculation module of ENM was used to predict the noise impacts of the Project at 11 receiver locations surrounding the project area indentified in **Table 4.2** and shown on **Figure 1.2**.

Table 4.2 – Receiver Locations

ID	Owner Name/Location	Easting	Northing	Comment
1	Hackfath	765158	6262213	Noise monitoring location NM1
2	Alevras 2	764244	6263646	Noise monitoring undertaken at NM4 (i.e. gate and back calculated to NM2)
3	Alevras 1	764005	6263656	Noise monitoring undertaken at NM4 (i.e. gate and back calculated to NM3)
4	Sunny Point	762633	6263714	-
5	Langley Heights [1]	764396	6263293	Commercial agreement in place
6	North East of Site	766021	6264384	-
7	Nestle Brae	761805	6261925	-
8	West of Site	761015	6263361	-
9	off Oberon Quarry Road	765425	6263525	-
10	North West of Site	762712	6264351	-
11	North of Site	764367	6263964	-

Note: 1 Commercial agreement in place with Oberon Quarries

Oberon Quarries has a commercial agreement in place with Property 5. There are also three other properties (i.e. Property 12 – 'Linnane Park', Property 13 – 'Rocklea' and Property 14 – 'Westrel') which are owned by Oberon Quarries or related parties and have not been included in the NIA.

4.5 Meteorological Conditions

Section 5 of the INP (EPA, 2000) notes that there are two approaches for the assessment of meteorological (including gradient winds and temperature inversions) effects on the propagation of noise source to the receiver. The simple method is to use default conditions outlined in the INP (EPA, 2000). Alternatively, the local meteorological data can be used to determine the presence of weather conditions that would be expected to occur at a particular site for a significant period of time.

Default INP wind conditions were initially used in the modelling of the predicted noise levels. This approach assumes that source-to-receiver gradient winds are present for a significant amount of time. As noted in the INP (EPA, 2000), this conservative approach predicted potential noise impacts that would be above the project-specific noise criteria.

To enable a more detailed assessment of meteorological effects, the availability of local meteorological data was investigated. It was found that there were no representative weather stations in proximity to the quarry. To address this, pDs Consultancy was engaged to compile a representative meteorological data set using TAPM V4. This data was analysed to determine the likely frequency of occurrence of prevailing winds and temperature inversions. The detailed analysis of the meteorological data and windroses prepared by pDs Consultancy are provided in **Appendix C**. The windroses indicate the presence of prevailing seasonal wind conditions that create vectored source-to-receiver winds for a significant period of time (i.e. greater than 30% of the time). The frequency of occurrence of the dominant prevailing seasonal wind conditions, as indicated by the windroses, is presented in **Table 4.3**.

Table 4.3 – Frequency of Occurrence of Prevailing Seasonal Winds

Season	Wind Direction	Frequency of Occurrence (%)			
		Calm	0.76 m/s to 1.5 m/s	1.5 m/s to 3 m/s	> 3 m/s
Day-time					
Summer	ENE to ESE	1.6	2.1	23.9	19.5
Autumn	E to SE	1.8	4.7	23.8	10.1
Spring	W to NW	0.3	0.3	14.1	27.6
Evening					
Summer	E to ESE	0.8	2.2	29.9	21.2
Autumn	E to ESE	1.6	5.7	35.6	7.6
Winter	SSW to WSW	0.0	1.1	16.8	23.1
Spring	SW to W	0.3	2.5	17.3	13.8
Night					
Summer	ENE to ESE	0.1	2.3	37.9	16.1
Autumn	ENE to ESE	0.7	6.8	26.3	10.4
Spring	W to NW	0.5	0.4	15.4	9.5

The results of the wind analysis indicate the presence of vectored source-to-receiver winds occurring up to or greater than 30% of the time during summer and autumn day-time period; during the evening period for all seasons; and during the summer, autumn and spring night-time period. The vectored winds are components of the prevailing winds identified in **Table 4.3**. Therefore, as part of the noise assessment the following prevailing wind scenarios, identified as significant in accordance with the INP (EPA, 2000), have been considered:

- 3 m/s east-north-easterly to east-south-easterly winds during the summer day-time, evening and night-time periods;
- 3 m/s easterly to south-easterly wind during the autumn day-time, evening and night-time periods;
- 3 m/s south-west to westerly wind during the winter evening period; and
- 3 m/s south-west to westerly wind during the spring evening and night-time periods.

The analysis of the available meteorological data/windroses indicates the presence of vectored winds from the west to north-west occurring in the day-time during winter and spring. As defined by the INP (EPA, 2000), the occurrence of these conditions is not considered significant. However, observations during site visits indicate the presence of west to north-westerly winds during the day-time at the wind speeds typically around 2 m/s. The available meteorological data/windroses indicate wind speeds up to 3.0 m/s are likely however they occur less than 15% of the time. A west to north-west wind (vectored or direct) represents a worst case source to receiver wind to the closest receiver (Location 1 – Hackfath). The predicted noise impacts at 2 to 3 m/s are likely to represent a worst case and potentially overstate the impact on the Location 1 – Hackfath. Notwithstanding this, the noise assessment (refer to **Section 6.0**) also considers the following non-significant meteorological conditions for the 7.00 am to 6.00 pm day-time period:

- 2.0 and 3.0 m/s westerly wind during the winter and spring day-time period.

The ongoing quarrying and processing operations would not be undertaken during the evening or night-time periods. During the night time period between 6.00 am to 7.00 am and the evening period from 6.00 pm to 10.00 pm operations at the quarry would be limited to product delivery (i.e. a maximum of four laden delivery trucks could be dispatched from the site per hour (a total eight truck movements per hour)). These operational restrictions are consistent with the 1993 development consent and current operational practices undertaken at the quarry.

Depending on the time of year, inversion conditions could be present during the night time period from 6.00 am to 7.00 am and the later part of the evening period. The analysis of the meteorological data prepared by pDs Consultancy indicates F to G class stability conditions could occur over the winter evening and night-time periods approximately 40% of the time. From Shooters Hill Road the access road to the quarry runs through a valley where drainage flow from the south to the north would naturally occur. Therefore as part of the noise assessment the following winter meteorological condition will also be considered for the 6.00 am to 7.00 am period of the night time and the evening period:

- F class stability with a 2 m/s southerly drainage flow (i.e. towards Lake Oberon) winter night-time (6.00 am to 7.00 am) and evening periods.

5.0 Predicted Impacts

5.1 Operational Noise Levels

5.1.1 Predicted Noise Levels

ENM's Single Point calculation feature was used to determine noise levels from the ongoing operation of the quarry at the nearest residential receiver locations identified in **Section 4.4**, under the meteorological conditions described in **Section 4.5**.

Table 5.1 presents the predicted operational noise levels for the ongoing operation of the quarry with quarrying activities occurring in either the northern extension or the southern extension of the pit respectively. The operational scenarios discussed in **Section 4.1** associated with full operation of the process plant and the loading and dispatch of product trucks has been considered in combination with the two quarrying scenarios (i.e. quarrying occurring in the Northern extraction area and quarrying occurring in the Southern extraction area).

In **Tables 5.1** the predicted operational noise levels for the Oberon Quarry have been compared with a target Project-specific Noise Levels for each receiver location of 35 dB(A).

5.1.2 Control Measures

The EIS is seeking approval for the continued operation of Oberon Quarries to allow for the continued extraction of the remaining 10 million tonnes of basalt reserves. The predicted noise levels in **Table 5.1** are based on the sound power levels, presented in **Section 4.2**, which represent the equipment currently in use at Oberon Quarries. For the continued operation of the quarry it has been assumed that the equipment will be well maintained and operated in accordance with the manufacture's recommendations. Notwithstanding this, the results in **Table 5.1** indicate the ongoing operation of Oberon Quarries could result in noise levels exceeding a target PSNL of 35 dB(A).

Table 5.1 – Predicted Operational Noise Levels – Existing Quarry Operations and Equipment under Significant Meteorological Conditions, dB(A)

Modelled Scenario		**Calm Neutral**		**Summer Day**		**Autumn Day**	
Met Condition		**0 m/s Calm**		**3 m/s ENE – ESE [1]**		**3 m/s E – ESE [1]**	
ID	Owner Name	Quarry	Quarry + Product Delivery	Quarry	Quarry + Product Delivery	Quarry	Quarry + Product Delivery
Quarrying in Northern Extraction Area							
1	Hackfath	33	34	31	32	30	31
2	Alevras 2	26	27	25	30	25	30
3	Alevras 1	27	28	29	30	29	30
4	Sunny Point	-	-	30	30	30	30
5	Langley Heights [2]	28	32	27	35	27	35
6	North East of Site	-	-	-	-	-	-
7	Nestle Brae	-	-	35	35	35	35
8	West of Site	-	-	32	32	32	32
9	off Oberon Quarry Road	-	25	-	-	-	-
10	North West of Site	-	-	26	26	26	26
11	North of Site	-	-	-	27	-	27

Table 5.1 – Predicted Operational Noise Levels – Existing Quarry Operations and Equipment under Significant Meteorological Conditions, dB(A) (cont)

Modelled Scenario		Calm Neutral		Summer Day		Autumn Day	
Met Condition		0 m/s Calm		3 m/s ENE – ESE [1]		3 m/s E – ESE [1]	
ID	Owner Name	Quarry	Quarry + Product Delivery	Quarry	Quarry + Product Delivery	Quarry	Quarry + Product Delivery
Quarrying in Southern Extraction Area (when equipment is operating on top of Racecourse Hill)							
1	Hackfath	35	36	32	33	32	33
2	Alevras 2	-	25	-	29	-	29
3	Alevras 1	-	-	-	27	-	27
4	Sunny Point	-	-	39	39	39	39
5	Langley Heights [2]	25	31	26	34	26	34
6	North East of Site	-	-	-	-	-	-
7	Nestle Brae	-	-	36	36	35	36
8	West of Site	-	-	34	34	34	34
9	off Oberon Quarry Road	26	26	24	25	24	25
10	North West of Site	-	-	33	33	33	33
11	North of Site	-	-	-	26	-	26

Notes: 1 Results for directions quoted as a range are the maximum noise level experienced by a receiver within that range of wind directions.
2 Commercial agreement in place with resident.
- Predicted noise level less than 25 dB(A).

Control measures that have been considered as a part of the ongoing operation of Oberon Quarries include:

- maintenance of the existing equipment and associated sound attenuation features including mufflers, sound suppression lining of equipment and equipment locations/orientation;
- increasing the height of the earth-berm situated along the eastern extent of the process plant area;
- attenuation of the crushing and screening plant through the construction of a partial building on the eastern side of the plant;
- location of processing equipment or part thereof within the quarry area;
- minimising equipment located on the top of the quarry extraction area during adverse meteorological conditions; and
- operational speeds of the road haulage trucks as they enter and leave the site.

Of the above noise control measures, the maintenance of the existing sound suppression features on existing equipment and the management of road haulage trucks have been considered as a part of the ongoing operation of the existing quarry. As a part of the proposed development, Oberon Quarries is proposing to replace some of the existing crushing and screening plant and include an additional cone crusher.

The replacement/new crushing and screening plant will be more energy efficient, produce fewer fines and result in an overall reduction in the environmental impacts of the operation. While all other aspects of the existing quarry operation remain unchanged, the purchase of replacement/ new crushing and screening plant provides an opportunity to install equipment with lower overall sound power.

Table 5.2 presents the predicted operational noise levels for the quarry with new crushing plant that has a SWL 6 dB less than the existing equipment and screening plant that has a SWL 3 dB less than the existing equipment.

Table 5.2 – Predicted Operational Noise Levels – New Attenuated Crushing and Screening Plant under Significant Meteorological Conditions, dB(A)

Modelled Scenario		**Calm Neutral**		**Summer Day**		**Autumn Day**	
Met Condition		**0 m/s Calm**		**3 m/s ENE – ESE [1]**		**3 m/s E – ESE [1]**	
ID	Owner Name	Quarry	Quarry + Product Delivery	Quarry	Quarry + Product Delivery	Quarry	Quarry + Product Delivery
Quarrying in Northern Extraction Area							
1	Hackfath	31	33	29	31	28	30
2	Alevras 2	-	26	-	30	-	30
3	Alevras 1	25	25	26	28	26	28
4	Sunny Point	-	-	27	27	27	27
5	Langley Heights [2]	26	31	-	34	-	34
6	North East of Site	-	-	-	-	-	-
7	Nestle Brae	-	-	32	32	31	31
8	West of Site	-	-	29	29	29	29
9	off Oberon Quarry Road	-	-	-	-	-	-
10	North West of Site	-	-	-	25	-	25
11	North of Site	-	-	-	26	-	26
Quarrying in Southern Extraction Area (when equipment is operating on top of Racecourse Hill)							
1	Hackfath	33	34	30	32	29	31
2	Alevras 2	-	-	-	29	-	29
3	Alevras 1	-	-	-	26	-	26
4	Sunny Point	-	-	35	35	35	35
5	Langley Heights [2]	-	30	-	34	-	34
6	North East of Site	-	-	-	-	-	-
7	Nestle Brae	-	-	34	34	34	34
8	West of Site	-	-	31	31	31	31
9	off Oberon Quarry Road	-	-	-	-	-	-
10	North West of Site	-	-	30	30	30	30
11	North of Site	-	-	-	26	-	26

Notes: 1 Results for directions quoted as a range are the maximum noise level experienced by a receiver within that range of wind directions.
2 Commercial agreement in place with resident.
- Predicted noise level less than 25 dB(A).

The results in **Table 5.2** show a reduction in the noise impacts from the quarry operations when compared to the predicted noise impacts in **Table 5.1**. As can be seen by comparing results in **Tables 5.1** and **5.2**, under worst case significant meteorological conditions the replacement of existing crusher and screens as proposed is predicted to reduce noise levels by approximately up to 4 dB.

Modelling of operations in the Southern Extraction Area as set out in **Table 5.2**, include extraction equipment operating on top of Racecourse Hill. This will only occur for short periods while the top extraction bench is opened up. During the majority of quarry operations, the time the extraction equipment will be operating below the top of the hill and will be acoustically shielded from surrounding receivers. Once the extraction bench is opened up and equipment is operating at a level below the surface, noise levels at Nestle Brae and Sunny Point will be approximately 2 dB(A) lower and consistent with noise levels for the northern extraction area as shown in **Table 5.1**.

5.1.3 Product Dispatch

While the quarry and processing area would only continue to operate during the day-time, road haulage trucks will continue to access the site from 6.00 am to 7.00 am during the night-time period and from 6.00 pm to 10.00 pm during the evening. It is proposed that up to a maximum of four laden delivery trucks could be dispatched from the site per hour (a total eight truck movements per hour).

Table 5.3 presents the predicted noise levels from the road haulage trucks as they enter the site, are loaded with product and then leave the site. ENM's Single Point calculation feature was used to determine noise levels from the road haulage trucks at the nearest residential receiver locations identified in **Section 4.4**, under the meteorological conditions described in **Section 4.5**.

Table 5.3 – Predicted Noise Levels for Delivery Trucks, dB(A)

Modelled Scenario		Calm Neutral	Summer Evening	Autumn Evening	Winter Evening	Winter Evening/Night	Spring Evening
Met Condition		0m/s Calm	3m/s E – SE [1]	3m/s E – ESE [1]	3m/s SW – W [1]	F Class Stability 2m/s Southerly Drainage Flow	3m/s WSW
ID	Owner Name	Product Dispatch	Product Dispatch	Product Dispatch	Product Dispatch	Product Dispatch	Product Dispatch
1	Hackfath	29	-	25	33	34	33
2	Alevras 2	-	-	-	-	33	-
3	Alevras 1	-	29	27	-	25	-
4	Sunny Point	-	-	-	-	-	-
5	Langley Heights [2]	30	34	33	30	38	30
6	North East of Site	-	-	-	-	27	-
7	Nestle Brae	-	-	-	-	-	-
8	West of Site	-	-	-	-	-	-
9	off Oberon Quarry Road	-	-	-	29	33	29
10	North West of Site	-	-	-	-	-	-
11	North of Site	-	25	-	-	30	-

Notes: 1 Results for directions quoted as a range are the maximum noise level experienced by a receiver within that range of wind directions.
2 Commercial agreement in place with resident.
- Predicted noise level less than 25 dB(A).

5.1.4 Summary of Findings

With the control measures discussed in **Section 5.1.2** above in place, the number of potential exceedances of the target PSNL of 35 dB(A) for the day-time activity in **Table 5.2** and for the night-time/evening activities in **Table 5.3** are summarised in **Table 5.4**.

Table 5.4 – Summary of Predicted Day-time Activity Noise Impacts

Maximum Level of Exceedance	Private Residences (Receiver No.) with Predicted Exceedance of PSNL		
	Day [1]		Evening and Night [2]
	Northern Extraction Area	Southern Extraction Area	
> 36 to 38 dB(A)	-	-	5 [3]
> 38 to 40 dB(A)	-	-	-

Notes: 1 Summary of results in **Table 5.2**.
2 Summary of results in **Table 5.3**.
3 Commercial agreement in place with resident.

Section 10 of the INP (EPA, 2000) notes that when the predicted noise impacts exceed the target Project-specific Noise Levels, noise mitigation strategies should be assessed. The control measures outlined above in **Section 5.1.2** address noise control at the source. The INP (EPA, 2000) also outlines a range of strategies for the control of the transmission of the noise and control of the noise at the receiver. The strategies that have been considered for the Project include:

- Controlling noise at the source through the elimination of noisy equipment and relocating equipment or re-orienting equipment to reduce the noise impacts. Where practical, this has been included in the control measures outlined above in **Section 5.1.2** and includes the use of new attenuation crushing plant and screening plant, and the maintenance of equipment. Other potential changes to the key noise sources include changing the location of the primary crushing plant to a location within the quarry and the installation of fixed noise control barriers around the existing crushing and screening plant were found to be not feasible.

- Controlling the transmission of noise through the construction of additional noise barriers along the eastern side of the processing area to further manage noise impacts from this area. While investigated and considered as a possible alternative, it was determined the construction of a noise barrier was not feasible as it would have to be in excess of 4 m high to be effective. Further raising of the existing bund for construction of a 4 m high wall on the existing bund is not considered feasible.

- Controlling noise at the receiver has not been investigated as a part of this assessment apart from recognising that Oberon Quarries has a commercial agreement in place with land identified as residential receiver Location 5 – Langley Heights.

5.2 Sleep Disturbance

Noise sources that could lead to sleep disturbance are typically transient noises and often have tonal characteristics. Activities occurring within the 6.00 am to 7.00 am period of the night-time that could lead to sleep disturbance include:

- public road haul trucks entering and leaving the site;
- CAT 980H Loader - working around stockpile area loading trucks; and
- reversing beepers.

The predicted $L_{A1,1minute}$ noise levels associated with these ongoing activities within the night period (6.00 am–7.00 am) are unlikely to lead to sleep disturbance in the nearby residential locations.

The predicted received $L_{A1,1minute}$ noise levels associated with the ongoing night-time activities are presented in **Table 5.5**.

Table 5.5 – Predicted Sleep Disturbance Noise Levels, dB(A)

Modelled Scenario		Calm Neutral 0 m/s Calm	Adverse Conditions F Class Stability or Gradient Wind	Sleep Disturbance Noise Goal $L_{A1,1minute}$
ID	Owner Name			
1	Hackfath	37	42	45
2	Alevras 2	29	37	45
3	Alevras 1	33	39	45
4	Sunny Point	< 25	27	45
5	Langley Heights [2]	39	44	45
6	North East of Site	< 25	33	45
7	Nestle Brae	< 25	24	45
8	West of Site	< 25	21	45
9	off Oberon Quarry Road	27	37	45
10	North West of Site	< 25	25	45
11	North of Site	26	38	45

Note: 1 Commercial agreement in place with resident.

The predicted noise levels in **Table 5.5** meet the recommended sleep disturbance noise goals outlined in **Section 3.4** at all residential receiver. The predicted noise levels that approach the recommended sleep disturbance noise goal are specifically associated with the product trucks entering and leaving the site.

5.3 Road Traffic Noise Impacts

Assessment of the road traffic noise impact of the Project has been conducted at three setback distances representative of the residential receivers likely to be influenced by movement of product trucks travelling to or from Oberon Quarry along Oberon Quarry Road, Shooters Hill Road, Edith Road and Titania Road. The road traffic noise impacts were modelled at setback distances of 60 m, 110 m and 250 m from the centre line of Oberon Quarry Road, Shooters Hill Road, Edith Road and Titania Road. Predictions were based on

a maximum of eight truck movements per hour, an average speed on Shooters Hill Road, Edith Road and Titania Road of 100 km/h with no noise barriers included in the traffic noise prediction model. The results of traffic noise modelling are presented below in **Table 5.6.**

Table 5.6 – Predicted Shooters Hill Road, Edith Road and Titania Road Day and Night Road Traffic Noise Levels, dB(A)

Receiver	Setback Distance, m	Period	Assessment Criteria, $L_{Aeq,1\ hour}$	Traffic Noise Levels, $L_{Aeq,1\ hour}$
Oberon Quarry Road, Shooters Hill Road, Edith Road, Titania Road	60	Day	55	47
		Night	50	
	110	Day	55	43
		Night	50	
	250	Day	55	36
		Night	50	

The results presented in **Table 5.6** indicate the predicted road traffic noise levels associated with product trucks travelling to or from Oberon Quarries' operations do not exceed the day and night time road traffic noise criteria outlined in the NSW *Road Noise Policy* (DECCW, 2011) presented in **Table 3.2**.

6.0 Non-Significant Meteorological Conditions

When assessing noise impacts, the INP (EPA, 2000) notes that the project-specific noise levels are expected to apply under weather conditions characteristic of an area. The INP (EPA, 2000) notes that these conditions may include calm, winds and temperature inversions.

Wind is considered to be a significant feature where source-to-receiver vectored wind speeds (at 10 m height) of 3 m/s or below occur for 30% of the time or more in any assessment period (day, evening, night) in any season. The INP (EPA, 2000) states in Section 5.2:

> Where there is 30 per cent or more occurrence of wind speeds below 3 m/s (source-to-receiver component), then use the highest wind speed (below 3 m/s) instead of the default.
>
> Where there is less than a 30 per cent occurrence of wind of up to 3 m/s (source-to-receiver component), wind is not included in the noise-prediction calculation.

When assessing a development, the noise levels predicted under significant meteorological conditions for each receiver are compared with the project-specific noise levels, to establish whether the meteorological effect will cause an impact.

However, when assessing noise compliance, an Environment Protection License (EPL) typically notes that the project noise limits/criteria are expected to apply under weather conditions characteristic of an area (i.e. not just significant conditions). A typical EPL noise condition would state:

L3.2 The noise emission limits identified in condition L3.1 apply under meteorological conditions of:

- Wind speed up to 3 m/s at 10m above ground level; or
- Temperature inversion conditions of up to 3^0 C/100 m and wind speed up to 2 m/s at 10 m above ground level.

That is, the noise criteria applies to all wind conditions up to and including 3 m/s that were potentially not assessed as a part of the development application.

The Oberon Quarry EPL 4442 makes no reference to the applicability of the meteorological conditions with the clauses regarding noise limited to the following:

L3.1 Noise from the premises must not exceed:

a) 36 dB(A) LAeq(15 minute) during the day (7 am to 6 pm) Monday to Friday and 7.00 am to 5.00 pm Saturday ; and

b) 35 dB(A) LAeq(15 minute) during the evening (6 pm to 10 pm) Monday to Friday; and

c) at all other times 35 dB(A) LAeq (15 minute), except as expressly provided by this licence.

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

L3.2 To determine compliance with condition(s) L6.1 noise must be measured at, or computed for, any affected noise sensitive location(s) (such as a residence, school or hospital). A modifying factor correction must be applied for tonal, impulsive or intermittent noise in accordance with the "Environmental Noise Management - NSW Industrial Noise Policy (January 2000)".

Without appropriate qualification, it is could be assumed that the noise criteria applies to all wind conditions. The cut off wind speed in the INP (EPA, 2000) for the assessment of meteorological conditions is 5 m/s for gradient (actual) wind and 3 m/s for the vectored source to receiver component of a gradient wind. The cut off wind speed for the assessment of compliance is typically an actual wind speed of 3 m/s.

It is unusual to have an exclusion when assessing compliance for non-significant wind conditions where the occurrence of vectored source-to-receiver component of wind is less than 30% of the total period in any season. Therefore, it is reasonable to assume that the noise criteria applies to all wind conditions up to and including wind speeds of 3 m/s.

The analysis of the meteorological data/windroses indicates the highest occurrence of day-time westerly source-to-receiver (quarry to Hackforth) winds occurs during spring. This analysis indicates the presence of:

- a westerly vectored wind up to a maximum of 28% of the day-time during spring. The main source of the vectored wind in spring is from the west-south-westerly to north-westerly winds between 3 to 5 m/s; and

- a gradient wind up to 3 m/s from the west occurring only 6% of the time during spring. Winds from the west-south-westerly through to the west-north-westerly up to 3 m/s occur approximately 14% of the time during spring.

That is, all the wind conditions less than 5 m/s that can create 3 m/s source-to-receivers winds during the day-time are non-significant (i.e. occur less than 30% of the time). Under the INP (EPA, 2000) these conditions do not need to be assessed. However, under a contemporary EPL the licence noise limits apply for all wind conditions up to and including 3 m/s (actual, not vectored).

It is important to note that the analysis of vectored winds is for assessment purposes only. Vectored winds are made up of actual winds from a number of different directions. Therefore, in reality, the frequency of an actual source to receiver wind may be significantly less than the assessed vectored source to receiver wind frequency. In the case of the Hackfath property, the frequency of actual source-to-receiver wind (a westerly up to 3 m/s) during the day-time is less than 6% of the time. However, the summation of winds up to 3 m/s in the westerly quadrant is approximately 14% of the time and could result in predicted higher noise levels at the Hackfath property.

In **Table 6.1** the noise impacts associate with the propagation of noise from the quarry to the Hackfath property has been considered for two non-significant wind conditions; 2.0 m/s westerly and 3.0 m/s westerly.

Table 6.1 – Predicted Operational Noise Levels – NM1 Hackfath Property

Met Condition		0 m/s Calm		2.0 m/s westerly		3.0 m/s westerly	
ID	Quarry Operations	Quarry	Quarry + Product Delivery	Quarry	Quarry + Product Delivery	Quarry	Quarry + Product Delivery
Existing Quarrying Operations							
1	Northern Extraction Area	34	35	40	40	42	42
1	Southern Extraction Area	36	36	41	41	42	43
Proposed Quarrying Operations							
1	Northern Extraction Area	32	34	38	38	41	41
1	Southern Extraction Area	34	35	39	40	41	42

Noise limits are set based on the higher of the predicted noise levels for calm or applicable significant wind conditions. Monitoring against noise limits can occur during any condition including calm, significant or non-significant wind conditions (i.e. where the 3 m/s source-to-receivers vectored wind occur less than 30% of the time).

If a development complied during calm or significant wind conditions, it does not necessarily mean it would comply during non-significant wind conditions. At the Location 1 – Hackfath the predicted noise level under calm conditions is 32 to 34 dB(A), 1 to 3 dB below the 35 dB(A) project-specific noise level. Under a non-significant 3.0 m/s westerly wind, that could occur as an actual source-to-receiver wind during the day-time less than 6% of the time, the predicted noise level is 41 to 42 dB(A). While not significant in terms of likelihood of occurrence the actual noise impact is up to 7 dB above the project-specific noise level for the Project of 35 dB(A). When considering the westerly quadrant for reporting purposes, this impact could occur up to 14% of the time.

The exclusion of non-significant winds from the noise impact assessment could understate the noise impacts and be a risk to the operation of the development. However, the INP (EPA, 2000) excludes non-significant winds from the noise impact assessment as inclusion of the predicted noise levels could overstate the noise impact and result in the implementation of noise control measures that are unwarranted or an impost on the operation of the facility.

The objective of the INP (EPA, 2000) is to help strike a feasible and reasonable balance between the establishment and operation of industrial activities and the protection of the community from noise levels that are intrusive or unpleasant.

As set out in **Appendix D** the owner of Location 1 – Mr Hackfath has stated that he fully supports the quarry and considers noise from the quarry to be acceptable and not intrusive. To formalise this and address potential breaches of Environment Protection Licence in regard to noise exceedances at this location during non-significant winds, Oberon Quarries could enter into a commercial agreement with the landholder of residential receiver Location 1 – Mr Hackfath.

7.0 Conclusion and Recommendations

7.1.1 Conclusion

Umwelt has undertaken a NIA of the Project in accordance with Section 10 of the INP (EPA, 2000). Two main operational scenarios were modelled to represent quarry operations with full operation of the process plant and extraction occurring either in the northern extent of the pit or in the southern extent of the pit. These two operational scenarios were then combined with the loading and dispatch of product trucks. As the loading and dispatch of product trucks could occur during the evening period and during the 6.00 am to 7.00 am period of the night-time when other aspects of the quarry operations are not undertaken this activity was modelled as a separate stand-alone activity.

The results in **Section 5.0** indicate that with appropriate control measures in place the operational noise levels from the quarry would not exceed the target Project-specific Noise Levels of 35 dB(A) under calm conditions or under conditions associated with significant wind conditions as defined by the INP (EPA, 2000).

The noise modelling of the day-time activities identified that one property not associated with the quarry (Location 1 – Hackfath) could experience noise levels above the target PSNL of 35 dB(A) under conditions associated with non-significant winds from the west. The maximum level of exceedance from the quarry would be 6 dB under weather conditions associated with a 3 m/s westerly wind. When combined with the operational noise from product trucks on the quarry access road, the maximum level of exceedance would be 7 dB. As noted in **Section 4**, a vectored wind of 3 m/s from the west occurs less than 30% of the time and is likely to overstate the noise impacts. However, it has been considered as the vectored source to receiver wind could occur during winter and spring and represents a worst case source to receiver wind for the closest receiver (Location 1 – Hackfath). As noted in **Section 4**, the more likely source to receiver wind condition is 2 m/s and occurs less than 6% of the time, whereas the vectored source to receiver component of the wind is associated with prevailing winds typically greater than 3 m/s in strength. To address the infrequent occurrence of these non-significant wind conditions it is recommended that Oberon Quarries enters into a commercial agreement with land identified as residential receiver Location 1 – Hackfath.

The results in **Section 5.0** indicate the proposed operation will not result in noise levels that exceed the sleep disturbance criterion.

The INP (EPA, 2000) notes that when predicted noise levels exceed the target PSNL a range of strategies should be considered to reduce the noise impact on offsite receivers. The three main strategies for noise control are:

- **controlling noise at the source** – There are three approaches to controlling noise generated by the source: Source elimination; Best Management Practice (BMP) and Best Available Technology Economically Achievable (BATEA);
- **controlling the transmission of noise** – There are two approaches: the use of barriers and land-use controls which attenuate noise by increasing the distance between source and receiver; and
- **controlling noise at the receiver –**- There are two approaches: negotiating an agreement with the landholder or acoustic treatment of dwellings to control noise.

If unacceptable noise impacts from a development persist after noise mitigation action has been undertaken, Section 8 and Section 10 of the INP (EPA, 2000) provide a process for

negotiating an agreement between the proponent and the affected party(s). One of the outcomes from this process is to set project-specific noise criterion for the Project that allows Oberon Quarries to adapt to changes in the noise expectations of the community while remaining economically viable. The project-specific noise criterion would be based on the noise levels achievable following the implementation of reasonable and feasible controls suggested in **Section 5.0**. In accordance with Section 10 of the INP (EPA, 2000) the achievable noise levels are those presented in **Table 5.2**.

It is anticipated that the inclusion of new crushing and screening plant would reduce the existing noise at the nearby residential receivers by up to 3 dB, when compared to the current operations. However, when combined with the truck movements along the access road to the quarry the full benefit of the improvements to the processing plant may not be realised at all the surrounding receiver locations.

The results presented in **Table 5.3** indicated that truck movements along the access road to the quarry can result in noise levels of up to 38 dB(A) without the quarry operating. Approximately 120 metres of the access road adjacent to the processing plant area will be duplicated to improve safety for trucks entering and leaving the process area. There will be no other changes to the access road as a part of the Project. Predicted noise impacts are consistent with the existing noise impacts from haulage trucks as they enter and leave the site. Historically Oberon Quarries has managed the noise impacts from the haulage trucks as they enter and leave the site through the control of operational speeds of the road and maintenance of the road.

Oberon Quarries is committed to implementing the controls discussed in **Section 5.0**. As discussed above, with these controls in place the results in **Section 5.0** indicate that only one property that is not associated with or has agreement with Oberon Quarries will experience operational noise levels above the day-time target Project-specific Noise Levels. One property (Location 5) will experience noise levels above the evening/night-time target Project-specific Noise Levels from product trucks on the quarry access road. This property has a commercial agreement with Oberon Quarries.

7.1.2 Recommended Management and Monitoring Program

Oberon Quarries will implement the noise attenuation measures discussed in **Section 5.0** within 12 months of the date of consent for the proposed development. In addition to this Oberon Quarries will also prepare and implement a Noise Management Plan for the Project. The Noise Management Plan will be integrated into the Oberon Quarry Environmental Management Plan. The Plan will include:

- A compliance noise monitoring program to confirm the operational noise levels of the Project that specifically addresses:
  - compliance with the target project-specific noise criteria for the Project; and
  - measurement and assessment of any transient noise levels using the sleep disturbance criteria descriptor of $L_{A1,\ 1\ minute}$.
- The noise monitoring should be based around an attended monitoring program that:
  - measures $L_{A90,15\ minute}$ and $L_{Aeq,15\ minute}$ ambient noise levels;
  - measures and/or calculates the contributed noise level from the operation;
  - measures other statistical noise levels representative of the noise environment including the maximum and minimum noise levels measured during the interval; and
  - records weather conditions at the monitoring site.

The results of the monitoring program should be reviewed by the Oberon Quarries management to assess compliance with the goals outlined in **Section 5.0** and reported in accordance with any requirements of the development consent or EPL.

Should compliance not be achieved, the noise monitoring contractor should identify any feasible and reasonable noise mitigation measures and provide a recommendation on what measures are to be implemented.

As part of the compliance noise monitoring program, the contractor will confirm that the attenuation measures discussed in **Section 5.0** have been implemented and that other mitigation measures are being investigated and implemented when reasonable and feasible to do so.

8.0 References

NSW Department of Environment, Climate Change and Water 2011. *NSW Road Noise Policy*.

NSW Environmental Protection Authority 1985. *Environmental Noise Control Manual*.

NSW Environment Protection Authority 2000. *New South Wales Industrial Noise Policy.*

NSW Environmental Protection Authority 2012. *Application Notes – NSW Industrial Noise Policy*.

U.S. Department of Transportation 2004. *US Federal Highway Administration Traffic Noise Model Version 2.5 Look-Up Tables*.

APPENDIX A

Glossary of Terms

Appendix A – Glossary and Abbreviations

1/3 Octave	Single octave bands divided into three parts.
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment background level – A single-figure background noise level representing each assessment period – day, evening and night (that is, three assessment background levels are determined for each 24-hr period of the monitoring period). It is determined by taking the lowest 10thpercentile of the L_{90} level for each assessment period.
Ambient Noise	The noise associated with a given environment. Typically a composite of sounds from many sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
dB(A), dBA	Decibels A-weighted.
dB(Z), dB(L)	Decibels Linear or decibels Z-weighted.
Decibel (dB)	The units of sound level and noise exposure measurement where a step of 10 dB is a ten-fold increase in intensity or sound energy and actually sounds a little more than twice as loud.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second – 1 oscillation per second equals 1 hertz.
L_{A10}	The percentile sound pressure level exceeded for 10% of the measurement period with 'A' frequency weighting calculated by statistical analysis. Typically used to assess the impact of an existing operation on a receiver area and is referred to as the cumulative noise levels at the receiver attributable to the noise source.
L_{A90}	Background Noise Level. The percentile sound pressure level exceeded for 90% of the measurement period with 'A' frequency weighting calculated by statistical analysis.
L_{Amax}	The maximum of the sound pressure levels recorded over an interval of 1 second.
$L_{A1,1minute}$	The measure of the short duration high-level noises that cause sleep arousal. The noise level is measured as the percentile sound pressure level that is exceeded 1 per cent of measurement period with 'A' frequency weighting calculated by statistical analysis during a measurement time interval of 1 minute.
$L_{Aeq,t}$	Equivalent continuous sound pressure level – The value of the sound pressure level of a continuous steady noise that, a measurement interval of time (t), has the same mean square sound pressure as the sound under consideration whose level varies with time. Usually measured in dB with 'A' weighting.

L_{An} Percentile level – A measure of the fluctuation of the sound pressure level which is exceeded ‘n’ per cent of the observation time.

RBL Rating background level – The overall single figure background level representing each assessment period over the whole monitoring period determined by taking the median of the ABLs found for each assessment period.

SPL (dBA) Noise: Sound pressure level – The basic measure of noise loudness. The level of the root-mean-square sound pressure in decibels given by:

$$SPL = 10.\log10\ (p/po)^2$$

where p is the rms sound pressure in pascals and po is the sound reference pressure at 20 μPa. decibels.

SWL Sound power level – a measure of the energy emitted from a source as sound and is given by:

$$SWL = 10.\log10\ (W/W_o)$$

where W is the sound power in watts and W_o is the sound reference power at 10^{-12} watts.

APPENDIX B

INP Assessment Methodology

Appendix B – INP Assessment Methodology

Industrial Noise Policy

Responsibility for the control of noise emissions in NSW is vested in Local Government and the Office of Environment and Heritage (OEH). The *NSW EPA Industrial Noise Policy* (INP), 2000, provides a framework and methodology for deriving limit conditions for consent and licence conditions. Using this policy the OEH regulates premises that are scheduled under the *Protection of the Environment Operations Act 1997* (POEO Act).

The specific INP (EPA, 2000) objectives are:

- to establish noise criteria that would protect the community from excessive intrusive noise and preserve the noise amenity for specific land uses;
- to use the criteria as the basis for deriving project-specific noise levels;
- to promote uniform methods to estimate and measure noise impacts, including a procedure for evaluating meteorological effects;
- to outline a range of mitigation measures that could be used to minimise noise impacts;
- to provide a formal process to guide the determination of feasible and reasonable noise limits for consent or licence conditions that reconcile noise impacts with the economic, social and environmental considerations of industrial development; and
- to carry out functions relating to the prevention, minimisation and control of noise from premises scheduled under the POEO Act.

The INP (EPA, 2000) is designed for large and complex industrial sources and outlines processes designed to strike a feasible and reasonable balance between the operation of industrial activities and the protection of the community from noise levels that are intrusive or unpleasant.

The application of the INP (EPA, 2000) involves the following processes:

- determining the project-specific noise levels (PSNL) from intrusiveness and amenity based measurement of the existing background and ambient noise levels. For existing industrial operations, the underlying level of noise present in the ambient noise, should be determined excluding the noise source under investigation;
- predicting or measuring the noise levels produced by the development; and
- comparing the predicted noise levels with the project-specific noise levels and assessing the impacts.

Where the project-specific noise levels are predicted to be exceeded the INP (EPA, 2000) provides guidelines on the assessment of feasible and reasonable noise mitigation strategies, including:

- 'weighing up' the benefit of the development against the social and environmental costs resulting from the noise impacts;
- establishment of achievable and agreed noise limits for the development in consultation with the consent authority; and
- undertaking performance monitoring of environmental noise levels to determine compliance with the consent and licence conditions.

INP Assessment Methodology

There are two criteria to consider when establishing project-specific noise levels for the assessment of industrial noise sources. These criteria are:

- **the intrusive noise criterion**, which is based on the background noise level plus 5 dB. The background noise level, or Rating Background Level (RBL), is determined in accordance with Section 3 of the INP (EPA, 2000) and is based on the use of noise monitoring data or INP default RBLs (refer to INP (EPA, 2000)), to establish the assessable background noise levels; and
- **the noise amenity criterion**, which is based on the recommended noise levels in the INP (EPA, 2000) for prescribed land use. The recommended acceptable and maximum ambient noise levels are outlined in Table 2.1 of the INP (EPA, 2000). Table 2.2 of the INP (EPA, 2000) outlines the requirements for developments where the existing noise level from industrial noise sources is close to the acceptable noise level.

The relevant tables in Section 2 of the INP relating to the amenity criteria relevant to the Project are presented in **Tables 1** and **2**.

Table 1 – Amenity Criteria – Recommended L_{Aeq} Noise Levels from Industrial Noise Sources

Type of Receiver	Indicative Noise Amenity Area	Time of Day	Recommended LAeq Noise Level	
			Acceptable	Recommended Maximum
Residence	Rural	Day	50 dB(A)	55 dB(A)
		Evening	45 dB(A)	50 dB(A)
		Night	40 dB(A)	45 dB(A)
	Suburban	Day	55 dB(A)	60 dB(A)
		Evening	45 dB(A)	50 dB(A)
		Night	40 dB(A)	45 dB(A)
	Urban	Day	60 dB(A)	65 dB(A)
		Evening	50 dB(A)	55 dB(A)
		Night	45 dB(A)	50 dB(A)
	Urban/Industrial Interface - for existing situations only	Day	65 dB(A)	70 dB(A)
		Evening	55 dB(A)	60 dB(A)
		Night	50 dB(A)	55 dB(A)
Area specifically reserved for passive recreation	All	When in use	50 dB(A)	55 dB(A)
Active recreation area (School playground, golf course)	All	When in use	55 dB(A)	60 dB(A)
Commercial premises	All	When in use	65 dB(A)	70 dB(A)
Industrial premises	All	When in use	70 dB(A)	75 dB(A)

Source: Table 2.1, INP (EPA, 2000).

Note 1: For Monday to Saturday, Daytime 7.00 am – 6.00 pm; Evening 6.00 pm – 10.00 pm; Night-time 10.00 pm – 7.00 am. On Sundays and Public Holidays, Daytime 8.00 am – 6.00 pm; Evening 6.00 pm – 10.00 pm;

Night-time, 10.00 pm – 8.00 am.

Note 2: The LAeq index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

Table 2 – Modification to Acceptable Noise Level (ANL) to Account for Existing Levels of Industrial Noise

Total Existing LAeq Noise Level from Industrial Noise Sources	Maximum LAeq Noise Level for Noise from New Sources Alone, dB
≥ Acceptable noise level plus 2 dB	If existing noise level is likely to decrease in future acceptable noise level minus 10 dB If existing noise level is unlikely to decrease in future existing noise level minus 10 dB
Acceptable noise level plus 1 dB	Acceptable noise level minus 8 dB
Acceptable noise level	Acceptable noise level minus 8 dB
Acceptable noise level minus 1 dB	Acceptable noise level minus 6 dB
Acceptable noise level minus 2 dB	Acceptable noise level minus 4 dB
Acceptable noise level minus 3 dB	Acceptable noise level minus 3 dB
Acceptable noise level minus 4 dB	Acceptable noise level minus 2 dB
Acceptable noise level minus 5 dB	Acceptable noise level minus 2 dB
Acceptable noise level minus 6 dB	Acceptable noise level minus 1 dB
<Acceptable noise level minus 6 dB	Acceptable noise level

Source: Table 2.2, INP (EPA 2000)

Note 1: ANL = recommended acceptable LAeq noise level for the specific receiver.

In assessing the noise impacts from industrial sources at residential receivers both the intrusive and amenity criteria are considered. For each period (day, evening and night) the most stringent of either the intrusive or amenity criteria becomes the limiting criterion and forms the project-specific noise level for the industrial source.

If the existing ambient noise level is close to the acceptable noise level, a new source must be controlled to preserve the amenity of the surrounding area. If the overall noise level from the industrial source already exceeds the acceptable noise level for the affected area, the L_{Aeq} noise level from a new source should meet the conditions set out in **Table 2** above.

INP Project-Specific Criteria

The INP (EPA, 2000) states that the criteria outlined in Tables 2.1 and 2.2 (refer to **Tables 1** and **2** above) have been selected to protect at least 90% of the population living in the vicinity of industrial noise sources from the adverse effects of noise for at least 90% of the time. Provided the criteria in the INP (EPA, 2000) are achieved, it is unlikely that most people would consider the resultant noise levels excessive.

Table 3 presents the methodology for assessing noise levels which may exceed the INP (EPA, 2000) project-specific noise assessment criteria.

Table 3 – Noise Impact Assessment Methodology

Assessment Criterion	Project-Specific Criteria	Noise Management Zone	Noise Affectation Zone
Intrusive	Rating background level plus 5 dB	≤ 5 dB above project-specific criteria	≥ 5 dB above project-specific criteria
Amenity	INP based on existing industrial level	≤ 5 dB above project-specific criteria	≥ 5 dB above project-specific criteria

For the purposes of assessing the potential noise impacts the project-specific, management and affectation criteria are further defined in the following sections.

Project-Specific Criteria

Most people in the broader community would generally consider exposure to noise levels that achieve the project-specific criteria to be acceptable.

Noise Management Zone

Depending on the degree of exceedance of the project-specific criteria (1 dB to 5 dB) noise impacts in this zone could range from negligible to moderate. It is recommended that management procedures be implemented including:

- prompt response to any issues of concern raised by community;
- noise monitoring on-site and within the community;
- refinement of on-site noise mitigation measures and plant operating procedures where practical;
- consideration of acoustical mitigation at receivers; and
- consideration of negotiated agreements with property holders.

Noise Affectation Zone

Exposure to noise levels corresponding to this zone (more than 5 dB above project-specific criteria) may be considered unacceptable by some property holders and implementation of the following measures may be required:

- discussions with relevant property holders to assess concerns and provide solutions;
- implementation of acoustical mitigation at receivers; and
- negotiated agreements with property holders.

Assessing Intrusiveness Criteria

The OEH has provided an application note for the assessment of the intrusiveness criteria such that the level for night time is no greater than the evening and evening is no greater than the daytime level (DECC, July 2006). The application note is reproduced below.

When the RBL for Evening or Night is Higher than the RBL for Daytime
http://www.environment.nsw.gov.au/noise/applicnotesindustnoise.htm

The results of long term unattended background noise monitoring can sometimes determine that the calculated Rating Background Level (RBL) for the evening or night period is higher than the RBL for the daytime period. These situations can often arise due to increased noise from for example insects or frogs during the evening and night in the warmer months or due to temperature inversion conditions during winter. The objective of carrying out long-term background noise monitoring is to determine existing background noise levels at a location that are indicative of the entire year.

In determining project-specific noise levels from the RBLs, the community's expectations also need to be considered. The community generally expects greater control of noise during the more sensitive evening and night-time periods than the less sensitive daytime period. Therefore, in determining project-specific noise levels for a particular development, it is generally recommended that the intrusive noise level for evening be set at no greater than the intrusive noise level for daytime. The intrusive noise level for night-time should be no greater than the intrusive noise level for day or evening. Alternative approaches to these recommendations may be adopted if appropriately justified.

Assessing Sleep Disturbance

The Department of Environment and Climate Change (DECC) have provided an application note for the assessment of sleep disturbance (DECC, July 2006). The application note is reproduced below.

Sleep Disturbance
http://www.environment.nsw.gov.au/noise/applicnotesindustnoise.htm

Peak noise level events, such as reversing beepers, noise from heavy items being dropped or other high noise level events, have the potential to cause sleep disturbance. The potential for high noise level events at night and effects on sleep should be addressed in noise assessments for both the construction and operational phases of a development. The INP does not specifically address sleep disturbance from high noise level events.

DEC reviewed research on sleep disturbance in the NSW Environmental Criteria for Road Traffic Noise (ECRTN) (EPA, 1999). This review concluded that the range of results is sufficiently diverse that it was not reasonable to issue new noise criteria for sleep disturbance.

From the research, DEC recognised that current sleep disturbance criterion of an $L_{A1, (1\ minute)}$ not exceeding the $L_{A90, (15\ minute)}$ by more than 15 dB(A) is not ideal. Nevertheless, as there is insufficient evidence to determine what should replace it, DEC will continue to use it as a guide to identify the likelihood of sleep disturbance. This means that where the criterion is met, sleep disturbance is not likely, but where it is not met, a more detailed analysis is required.

The detailed analysis should cover the maximum noise level or $L_{A1, (1\ minute)}$, that is, the extent to which the maximum noise level exceeds the background level and the number of times this happens during the night-time period. Some guidance on possible impact is contained in the review of research results in the appendices to the ECRTN. Other factors that may be important in assessing the extent of impacts on sleep include:

- how often high noise events will occur;
- time of day (normally between 10.00 pm and 7.00 am); and
- whether there are times of day when there is a clear change in the noise environment (such as during early morning shoulder periods).

The $L_{A1, (1\ minute)}$ descriptor is meant to represent a maximum noise level measured under 'fast' time response. DEC will accept analysis based on either $L_{A1, (1\ minute)}$ or $L_{A, (Max)}$.

APPENDIX C

Meteorological Analysis

Appendix C – Meteorological Analysis

The INP (EPA, 2000) requires that wind effects need to be assessed when wind is considered a feature of the area. Wind is considered a feature of the area where source-to-receiver winds of 3 m/s occur for 30% of the time in any assessment period.

Section 5 of the INP requires that noise impacts be assessed under weather conditions that would be expected to occur at a particular site for a significant period of time.

Meteorological data for the period January 2008 to December 2008 was sourced from pDs Consultancy. This data was analysed to determine prevailing wind conditions likely to influence the propagation of noise at the project site and is summarised as wind roses in **Table 3.1** and **Figures 3.1** to **3.4**.

Table 3.1 – Occurrence of Prevailing Winds per Wind Speed Category
(Each Season All Periods)

Season	Direction	< 0.76	0.76 to < 1.5	1.5 to < 3.0	3.0 to < 4.5	4.5 to 6.0	> 6.0
Summer	E	0.9%	1.1%	16.2%	10.5%	1.6%	-
	ENE		0.7%	9.0%	1.3%	-	-
	ESE		0.4%	5.8%	4.6%	0.5%	-
	SE		0.1%	1.7%	0.3%	-	-
	SSE		0.2%	0.7%	-	-	-
	S		0.3%	1.0%	-	-	-
	SSW		0.5%	1.1%	-	-	-
	WSW		0.6%	3.9%	4.4%	0.9%	0.2%
	SW		0.4%	3.5%	1.3%	0.2%	-
	NE		1.1%	1.2%	0.3%	-	-
	NNE		0.8%	0.8%	0.3%	-	-
	N		0.5%	1.0%	0.2%	-	-
	NNW		0.4%	1.7%	0.3%	-	-
	NW		0.5%	3.0%	1.3%	-	-
	W		0.5%	2.2%	4.2%	1.6%	-
	WNW		0.3%	2.7%	1.1%	-	-
Autumn	E	1.4%	2.2%	13.0%	3.4%	-	-
	ENE		1.9%	3.5%	0.4%	-	-
	ESE		2.2%	9.7%	5.8%	-	-
	SE		1.4%	3.5%	1.3%	-	-
	SSE		1.3%	1.3%	-	-	-
	S		0.4%	1.6%	-	-	-
	SSW		0.7%	2.8%	0.7%	-	-
	WSW		0.3%	2.5%	4.3%	1.4%	-
	SW		0.7%	4.1%	3.2%	0.1%	-
	NE		1.4%	1.0%	-	-	-
	NNE		1.3%	0.8%	-	-	-
	N		0.7%	1.0%	-	-	-
	NNW		0.5%	1.2%	0.1%	-	-
	NW		0.7%	3.8%	1.3%	0.4%	-
	W		0.6%	2.8%	2.3%	0.9%	-
	WNW		0.4%	3.2%	0.6%	-	-

Table 3.1 – Occurrence of Prevailing Winds per Wind Speed Category (cont)
(Each Season All Periods)

Season	Direction	< 0.76 m/s	0.76 m/s to < 1.5 m/s	1.5 m/s to < 3.0 m/s	3.0 m/s to < 4.5 m/s	4.5 m/s to 6.0 m/s	> 6.0 m/s
Winter	E	0.3%	0.3%	3.2%	4.3%	0.6%	-
	ENE		0.1%	1.6%	0.1%	-	-
	ESE		0.6%	2.8%	1.6%	0.7%	-
	SE		0.6%	2.5%	2.0%	-	-
	SSE		0.2%	1.3%	1.2%	-	-
	S		0.2%	2.8%	1.5%	-	-
	SSW		0.6%	3.6%	2.2%	-	-
	WSW		0.2%	3.6%	8.8%	7.2%	0.9%
	SW		0.3%	4.1%	3.7%	1.4%	-
	NE		0.4%	1.3%	0.2%	-	-
	NNE		0.1%	0.7%	-	-	-
	N		-	1.1%	0.4%	-	-
	NNW		0.3%	4.1%	0.4%	-	-
	NW		0.2%	2.7%	1.4%	0.1%	-
	W		-	2.5%	7.3%	4.3%	0.5%
	WNW		-	2.2%	4.5%	-	-
Spring	E	0.4%	1.1%	4.9%	4.9%	1.8%	-
	ENE		0.4%	3.6%	1.5%	-	-
	ESE		0.4%	2.6%	1.5%	0.1%	-
	SE		0.1%	1.5%	0.2%	-	-
	SSE		0.2%	1.4%	1.2%	0.2%	-
	S		0.6%	2.0%	0.6%	-	-
	SSW		0.4%	2.5%	0.2%	-	-
	WSW		0.3%	2.9%	7.2%	1.5%	0.6%
	SW		0.5%	3.7%	3.3%	-	-
	NE		0.9%	1.5%	0.5%	-	-
	NNE		1.1%	0.8%	-	-	-
	N		0.7%	1.8%	0.2%	-	-
	NNW		0.6%	2.6%	1.7%	0.2%	-
	NW		0.1%	4.9%	4.1%	1.4%	-
	W		0.1%	4.6%	4.2%	1.9%	0.3%
	WNW		0.1%	5.4%	4.0%	1.9%	0.2%

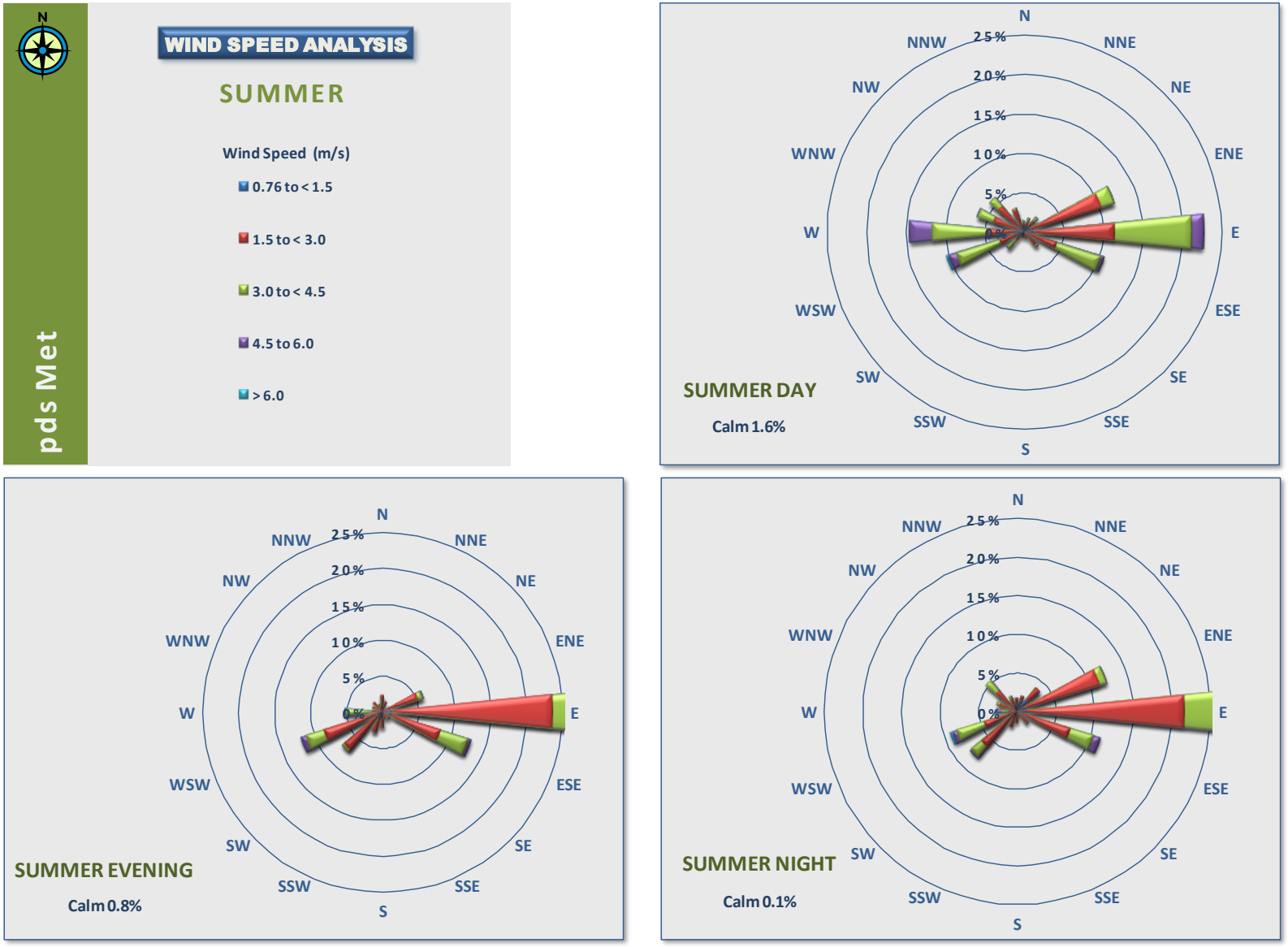


Figure 3.1 – Wind speed analysis, summer

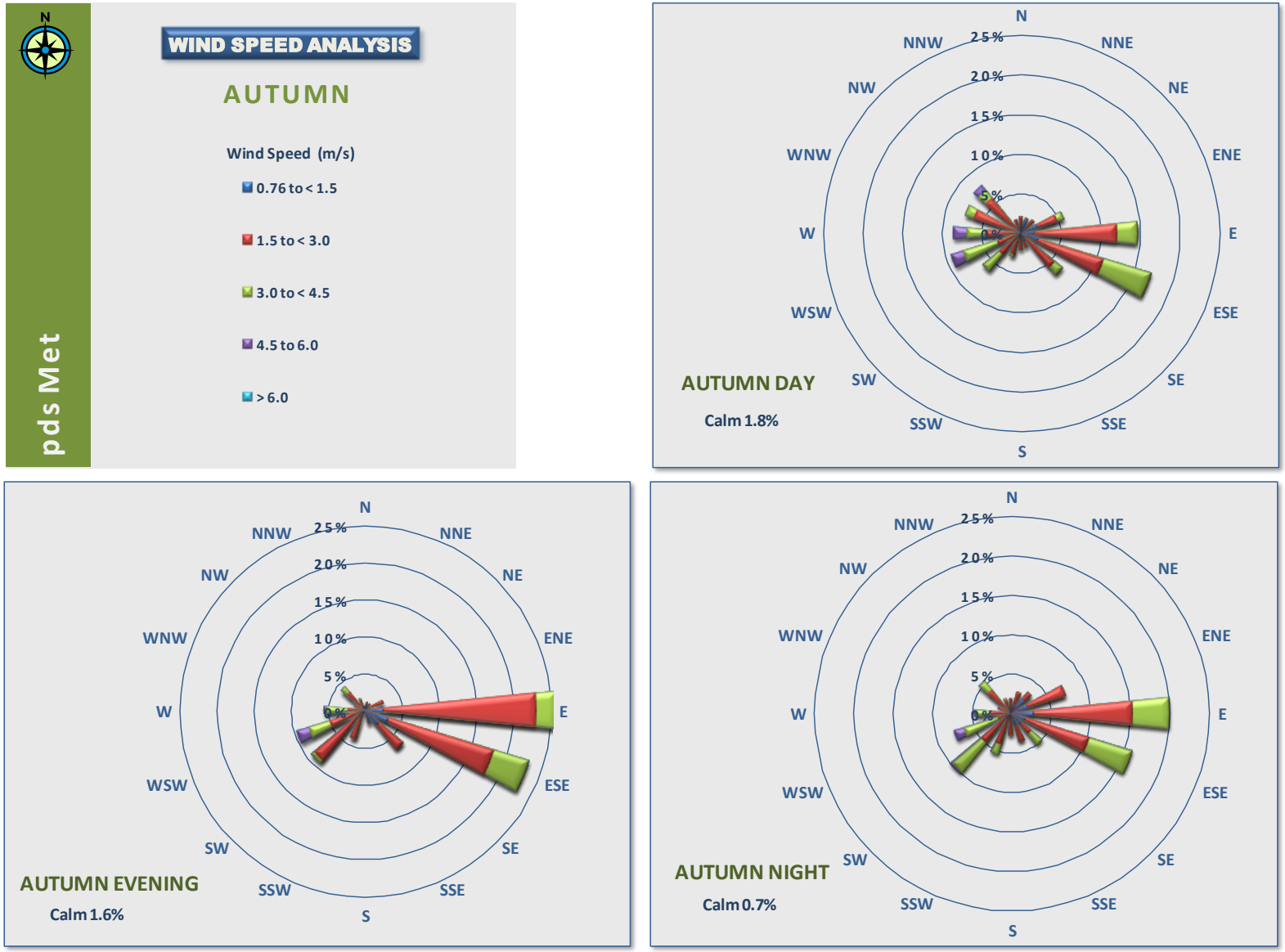


Figure 3.2 – Wind speed analysis, autumn

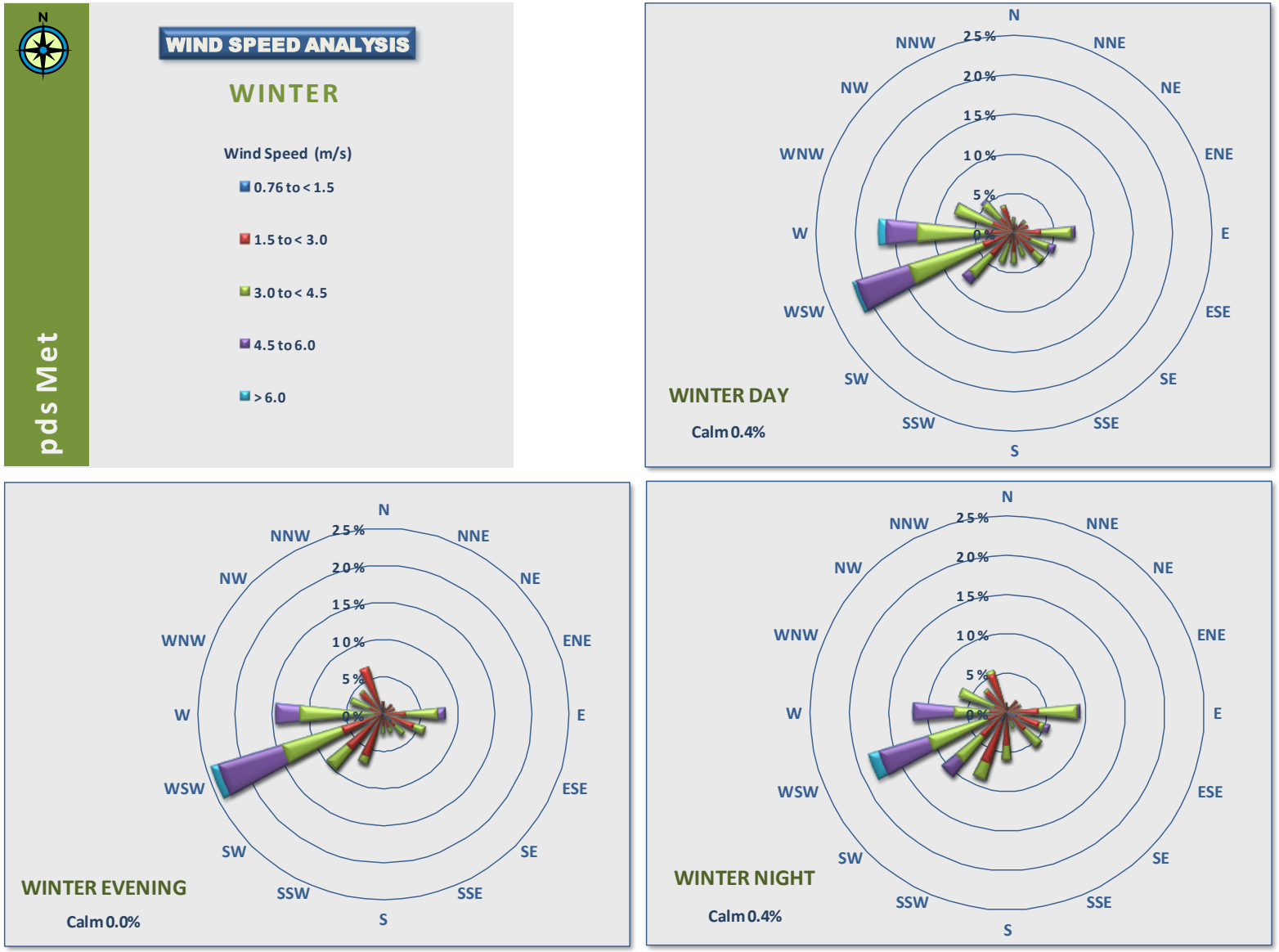


Figure 3.3 – Wind speed analysis, winter

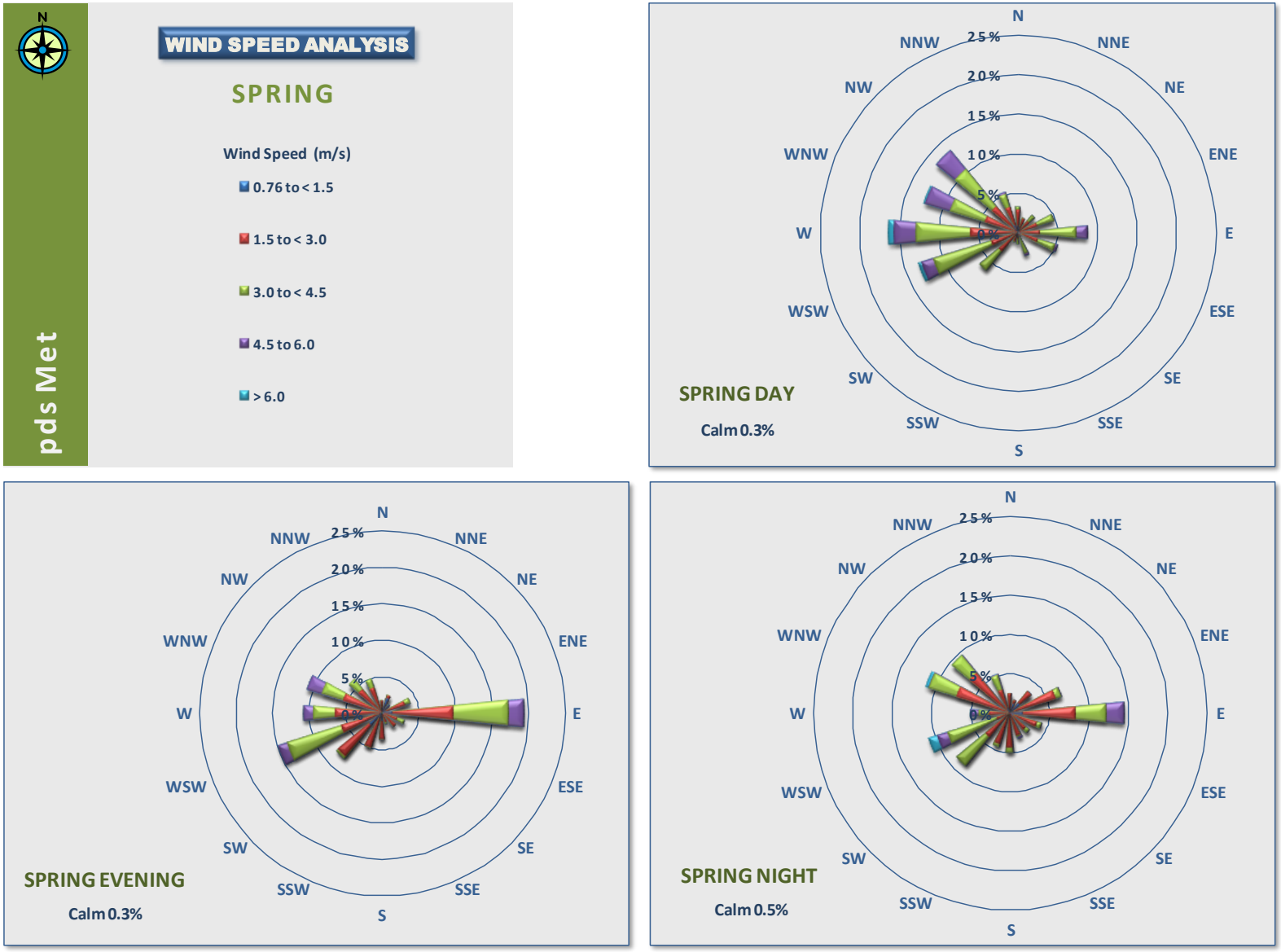


Figure 3.4 – Wind speed analysis, spring

APPENDIX D

Email from John Hackfath (Location 1)

Frances Davies

From: john.hackfath@bigpond.com
Sent: Wednesday, 21 August 2013 6:32 PM
To: Peter Jamieson
Subject: RE: 1296-Modification to Oberon Quarries Consent

Peter,

I fully support the operations of the quarry.
The current noise levels of 42dBa are not intrusive and acceptable.
If anyone would like to discuss the matter further I'm available on 0417 684 492.

Regards

John Hackfath