

2 August 2021

Attention: Lauren Evans
Team Leader



Department of Planning, Industry and Environment
4 Parramatta Square, 12 Darcy Street
Parramatta
2150

PO Box 1563
Warriewood
NSW 2102

ABN 45 162 835 083

Dear Lauren

SSD 7009: Marulan South Limestone Mine Continued Operations Project – endorsement of specialists preparing management plans

The draft development consent for SSD 7009, issued by the Department of Planning, Industry and Environment (DPIE), under Section 4.36 of the Environmental Planning and Assessment Act 1979 (EP&A Act) requires the preparation of various strategies and plans by a suitably qualified and experienced person whose appointment has been endorsed by the Planning Secretary.

The following table lists the relevant strategies and plans, identifies the company and person who is proposed to prepare these documents, and outlines why they are a suitably qualified and experienced person. Curriculum vitae (CV) for these people are appended to this letter.

It is requested that DPIE endorse the proposed specialists to prepare the strategies and plans required by the draft conditions of consent for the Marulan South Limestone Mine Continued Operations project.

Please don't hesitate to contact me should you have any queries or require additional information.

Kind Regards,

A handwritten signature in black ink, appearing to read 'Neville Hattingh', is written over a light blue horizontal line.

Neville Hattingh
Director

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	Strategy/management plan	Company	Suitably qualified and experienced person	Appendix with CVs
1	Noise management plan	Muller Acoustic Consulting	Rod has 30 years' experience in environmental and industrial acoustics, having spent over 10 years in a heavy industrial setting and a further 20 years as a consultant working in Australia, UK, Europe and Africa and is a Member of the Australian Acoustics Society (MAAS) and the Institute of Acoustics UK (MloA). He has extensive experience in environmental noise measurement and analysis, prediction and impact assessments, noise mitigation and management for a wide range of projects, with an emphasis in the extractive, industrial and manufacturing sectors. Rod has been undertaking noise and blasting assessments for mining and extractive projects during the last 20 years as a consultant, including the development of noise and blast management plans. A selected list of significant projects is provided below: <ul style="list-style-type: none"> ▪ McPhillamys Gold Project , Mine EIS and Pipeline EIS (2019) ▪ Friable Sands Project (Confidential Client) Hawkesbury Area (2020) ▪ Perilya Broken Hill – Potosi Blasting Assessment and Blast Management Plan ▪ Macka's Sand EIS (2008) ▪ Ravensworth & Marama Stage 3 EIS (2008) ▪ Port Waratah Coal Services – Kooragang Coal Terminal Project 3D and Project 3Exp EIS (2005-2007) ▪ Dunmore Quarry EIS (2006) He has specific experience in the Marulan area supporting the development of Peppertree Quarry since 2003 from initial inception through to EIS submission and modification in 2009. Rod has also conducted noise investigations for the lime kiln and ID fans at the Marulan South Limestone Mine site. Rod was also involved in the noise and blasting impact assessment for the nearby Lynwood Quarry, and continues to be involved in its ongoing compliance monitoring.	Appendix A
2	Blast management plan	Muller Acoustic Consulting		Appendix A
3	Air quality and greenhouse gas management plan	Todoroski Air Sciences	Aleks has a bachelor degree in mechanical engineering and 30 years of experience in air quality and environmental noise both in consulting and in government (including 10 years at the NSW EPA). He has completed air assessments for hundreds of mine and quarry projects, mainly in NSW, including many dozens of air quality management plans and systems for minimising dust emissions from extractive industries. Aleks has advised the World Bank, National EPA's, Commonwealth ministers, various state and territory agencies and policy makers on appropriate controls for managing air pollution. He served as the independent representative on the National Environment Protection Measure for Air Quality (NEPM (Air Quality)) peer review committee, where his role was to advise the Commonwealth on the progress of the states and territories in complying with the NEPM (Air Quality), and to develop the current national guidelines for air monitoring and reporting that the states are required to use.	Appendix B
4	Aboriginal heritage management plan	EMM Consulting (EMM)	The AHMP will be prepared by EMM Associate Archaeologist, Team Leader Ryan Desic (BA Hons Historical and Prehistoric Archaeology) who is a suitably qualified and experienced archaeologist and heritage consultant. Ryan has over 10 years' experience in consulting archaeology and co-authored	Appendix C

Strategy/management plan	Company	Suitably qualified and experienced person	Appendix with CVs
		the Aboriginal cultural heritage assessment (ACHA) for the Marulan South Limestone Mine Continued Operations project to support the Environmental Impact Statement. Accordingly, EMM is well-placed to prepare the AHMP as they are experienced with the project, its Aboriginal cultural heritage values, and have an existing relationship with the project registered Aboriginal parties (RAPs) and Heritage NSW. EMM regularly prepare ACHAs and AHMPs for projects throughout NSW. A copy of Ryan's CV is attached to this letter.	
5 Historic heritage management plan	EMM	The HHMP will be prepared by EMM Associate Archaeological, National Technical Leader Pamela Kottaras (BA Hons Historical and Prehistoric Archaeology) who is a suitably qualified and experienced archaeologist and heritage consultant. Pamela has over 20 years' experience as an archaeologist and heritage consultant across infrastructure, mining, energy and property development and construction. Pamela prepared the historical heritage assessment and statement of heritage impact for the Marulan South Limestone Mine Continued Operations project to support the Environmental Impact Statement. Accordingly, Pamela has extensive knowledge of the historical heritage values of the project and is suitably qualified to prepare the HHMP. A copy of Pamela's CV is attached to this letter.	Appendix C
6 Water management plan	Advisian	Michael Butcher is an Environmental Engineer with over 20 years engineering, consulting and management experience in the mining industry. He has prepared surface water assessments for a projects throughout Australia, including Marulan South Limestone Mine Continued Operations Surface Water Assessment as part of the Environmental Impact Statement for the project. Michael has prepared post approval Water Management Plans in NSW, including those for the Vickery Extension Project and Cadia Gold Mine. He has also completed Erosion and Sediment Control Plans for projects in sensitive environments throughout the Asia-Pacific. Michael is co-author of Minerals Industry Water Stewardship Handbook and provides leading practice water management strategies and engineering solutions to the mining industry.	Appendix D
7 Groundwater management plan (as a sub component of the water management plan)	Australasian Groundwater & Environmental Consultants (AGE)	Pieter Labuschagne, MSc Hydrogeology, has 20 years experience in mining/extractive industry projects. Pieter worked on similar projects for AngloGold Ashanti and Sout32 in South Africa and recently on Narrabri Coal Mine in NSW (groundwater water management plan, Narrabri Coal Mine). Pieter also participates in the Ulan Coal Groundwater Impact Assessment for MOD6 in June 2021. AGE completed the Groundwater Impact Assessment for the Marulan South Limestone Mine Continued Operations EIS between 2015 and 2019. James Tomlin is the co-author and key technical reviewer. James is a technical director of AGE and has an MSc in Hydrogeology and Groundwater Management and 25 years' experience in the mining industry. James completed a Response to Submission (RtS) for Marulan South Limestone Mine related to clarification and further information on predicted groundwater impacts relating to water licensing in June 2021. James was involved in the groundwater impact assessment for the Marulan South Limestone Mine (AGE, 2019). James completed various groundwater impact assessments	Appendix E

Strategy/management plan	Company	Suitably qualified and experienced person	Appendix with CVs
		(20+) for EIS and groundwater management plans and for Maules Creek Mine, Mangoola Mine, Bylong Project and Watermark Project, recently.	
8 Biodiversity management plan	Cambium Group	<p>Cambium Group have over 25 years experience in the field of environment and compliance management. They have been involved with the Marulan South Limestone Mine Continued Operations project since 2014, being responsible for data integration, spatial data management and preparation of EIS maps and figures. During this time, Cambium Group has worked closely with Boral, Element and liaised with the many specialist consultants to deliver this project, gaining in-depth knowledge of the development. Cambium Group has also been involved with Boral's adjoining Peppertree Quarry Modification 5 in the same capacity since 2015.</p> <p>Dr Emilie Mascarenhas and Mark Nolan will be responsible for preparing the Biodiversity Management Plan. Emilie has over 20 years' experience in environmental management and monitoring, information management and Geographic Information Systems (GIS) and Mark has over 28 years' experience in management of approvals, compliance and land access in the resources sector. Emilie and Mark have recently undertaken updates to the Peppertree Quarry <i>Biodiversity and Rehabilitation Management Plan</i> in accordance with the Modification 5 consent conditions. They have also been engaged to undertake the annual Rapid Visual Assessments and biennial Ecological Monitoring at the Peppertree Quarry rehabilitation areas since 2018. At Boral's Dunmore Lakes Sand Project, Emilie and Mark recently updated the <i>Flora and Fauna Management Plan, Rehabilitation Management Plan</i> and <i>Long-term Management Strategy</i> in accordance with the consent conditions for Modification 2 and with the endorsement of the Planning Secretary.</p>	Appendix F
9 Rehabilitation management strategy	Gordon Atkinson & Associates	<p>Gordon Atkinson is a qualified mining engineer, Chartered Professional, CP (Mining) and current holder of the NSW practising certificate as a quarry manager of mines other than underground mines or coal mines. He has retained his Associate Auditor – Environmental certification since 1997 through Exemplar Global.</p> <p>Gordon has over 40 years professional experience in mining and extractive industries both in Australia and overseas as detailed in the attached capability statement covering mine/quarry operations, planning and rehabilitation.</p> <p>At the Marulan South Limestone Mine, Gordon has prepared Mining Operations Plans and undertaken Annual Environmental and Management Report (AEMR)s since 2004. For the SSD 7009 project, Gordon has been the mine planner and has been extensively involved in the design and integration of the 30yr staged, mine plan with the site's rehabilitation strategy including progressive rehabilitation, water management and with the final, rehabilitated mine design and closure concepts. In addition to preparing the site's Rehabilitation Strategy, Gordon has been engaged to prepare the Rehabilitation Management Plan in accordance with the NSW Resource Regulator's most recent guidelines.</p>	Appendix G

Strategy/management plan	Company	Suitably qualified and experienced person	Appendix with CVs
10 Traffic management plan	Element Environment / Transport & Urban Planning	<p>Mark Roberts will author the Traffic Management Plan. Mark Roberts has over 10 years' experience in the environment sector and has been involved with the preparation and management of a range of environmental impact assessments under both NSW and Commonwealth legislation; environmental management plans and strategies; constraints analyses; bushfire and hazard assessment; and environmental planning advice.</p> <p>Mark's experience is across a broad range of industries including mining and extractives; road, water and electricity infrastructure; waste management; coal seam gas; and residential subdivisions.</p> <p>Mark has managed the complex environmental approvals process and the associated technical studies under Part 4, Part 5 and Part 3A (since repealed) of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act), including recently for the Hume Coal Project, Gloucester Gas Project, Genesis Xero Waste Facility and the Rosehill Sustainable Road Resource Centre.</p> <p>Mark was the lead author of the Marulan South Limestone Mine Continued Operations project EIS and therefore has an intimate knowledge of the project and the traffic related impacts and required management measures.</p> <p>Mark recently (2021) prepared two traffic management plans for the Sustainable Road Resource Centre project - SSD 10459.</p> <p>Terry Lawrence will be the technical reviewer of the Traffic Management Plan. Terry has over 40 years' experience in traffic engineering and transport planning fields in both the government and private sectors.</p> <p>This experience includes undertaking and participating in project teams for numerous projects and studies, as a lecturer and specialist trainer in traffic engineering, as well as experience in technical and managerial roles in traffic operations, road safety and traffic management.</p> <p>Terry prepared the traffic impact assessment for the Marulan South Limestone Mine Continued Operations project.</p>	Appendix H

Appendix A – Muller Acoustic Consulting CVs

Curriculum vitae

Rod Linnett, Senior Acoustic Consultant

Rod has 30 years' experience in environmental and industrial acoustics, having spent over 10 years in a heavy industrial setting and a further 20 years as a consultant working in Australia, UK, Europe and Africa. Rod has extensive experience in environmental noise measurement and analysis, prediction and impact assessments, noise mitigation and management for a wide range of projects, with an emphasis in the extractive, industrial and manufacturing sectors. Rod is a Member of the Australian Acoustics Society (MAAS) and the Institute of Acoustics UK (MIOA).

Career summary

Between 2010 and 2015, Rod was based in the UK where he focused primarily on lender finance EISA projects in developing countries. During this period, Rod revised and updated the approach taken for undertaking IFC based noise impact assessments requiring to incorporate the sustainability guidelines.

Rod has been leading and managing noise assessments based on the NSW Industrial Noise Policy since its introduction in 2000 and the recently updated Noise Policy for Industry in 2017. He is experienced in managing and responding to public and community issues, including liaising with regulatory authorities regarding approvals, consent conditions and compliance monitoring.

Prior to working in consulting in 2003, Rod was the Noise Control Officer at BHP Steel – Port Kembla Steelworks (NSW) where he gained extensive practical experience performing noise measurement and analysis, source investigation and identification.

Qualifications and Memberships

- Associate Diploma - Mechanical Engineering
- Member of the Australian Acoustic Society (MAAS)
- Member of the Institute of Acoustics UK (MIOA)

Areas of Expertise

- Environmental Noise Modelling & Assessment particularly Industrial and Mining
- Noise Monitoring / Survey Measurements
- Construction Noise and Vibration and Blast Monitoring
- Occupational Noise Assessments
- Lender Finance Noise Assessments (IFC) for SEIA

Career History

- Senior Acoustic Consultant, Muller Acoustic Consulting, 2017 - current
- Senior Engineer, Wilkinson Murray Australia (Newcastle), 2017-2017
- Principal Consultant, ERM Australia (Newcastle), 2015-2017
- Principal Consultant, ERM UK (Swansea), 2010-2015
- Senior Acoustics Engineer, ERM Australia (Sydney), 2009-2010
- Lead Acoustician, Umwelt Australia, 2008-2009
- Acoustics Consultant, Heggies Australia (Newcastle), 2002-2008
- Noise Control Officer, BHP Steel Port Kembla, 1992-2001

Key Career Projects

A summary of several key career projects Rod has worked on include:

Selected Relevant Project Experience

Regis Resources – McPhillamys Gold Project

Rod managed and directed the preparation of the noise impact assessment for the proposed open cut mine including a pipeline from Lithgow to Blayney, NSW.

Newcrest Mining Ltd – Bonikro / Hiré Operations Côté d'Ivoire West Africa

Rod conducted a site visit to assess the mine noise compliance with local and international requirements for a small pit exploitation situated within 500 metres of a village. The scope of work also included predictive noise modeling and noise impact assessment for future development of the mining operation up to 100 metres from noise sensitive receptors.

Whilst on site Rod delivered noise monitoring training to company personnel and implement QA / QC procedures for a revised compliance noise monitoring program. The development of a noise management plan identifying operational procedures and mining methods to minimise noise impacts facilitates proactive noise management and interaction between the operations, environmental and community teams on site.

Cobbora Open Cut Coal Mine, Gulgong, NSW Australia; Cobbora Holding Company

Rod managed and directed the preparation of the acoustic impact assessment for one of the largest planned open cut coal mines in NSW (40 MTPA). Being such a large mine on a Greenfields mine in a new mining province, noise impacts on the many adjacent landholders was a considerable issue that required thorough assessment and mitigation. Due to the constrictions of land ownership and land purchase, Rod worked with the client undertaking an iterative assessment to plot a 30 km rail route that is feasible from an engineering perspective and that will minimise land acquisition as a result of noise exposure.

Port Waratah Coal Services, Newcastle, NSW Australia; Kooragang Coal Terminal Expansion

Rod was the technical discipline lead required to manage and undertake detailed predictive noise modelling for the proposed expansion of the terminal leading to the development of acoustic specifications for the site to meet compliance limits. This led working with EPC Contractors, tender and acoustic design reviews for major plant items for Project 3D and Project 3Exp, concluding with acoustic compliance and certification.

David Brown Gear Industries (Textron) – Conveyor Drive Assembly Noise & Vibration Compliance Testing & Certification

As part of the procurement process for PWCS Rod conducted sound intensity measurements to determine equipment sound power levels of conveyor drives for the plant expansions program. The drives are a critical component of the noise reduction strategy and he was responsible for ensuring that the testing was conducted under the correct procedures and conditions. Rod also conducted a similar testing and certification regime with other manufacturers for other acoustic critical components such as conveyor idlers, motors, pumps, cranes as well as overall equipment compliance for large machinery such as stackers, reclaimers and conveyors.

Ulan Coal Mine, Mudgee NSW (XStrata)

Investigation into tonal noise emissions from overland conveyor system and CHPP. This involved developing measurement methods to assess the conveyor noise on and off site to identify the causes of the low frequency noise emissions from the conveyor. Assessment of noise from the CHPP and determine mitigation options and feasibility.

Ravensworth Operations NIA (Xstrata NSW) and Narrama Stage 2 Extended NIA

Rod conducted detailed noise modelling and prepared the Noise Impact Assessment of a 20 MTPA open cut coal mine in the Hunter Valley, NSW.

Detailed noise modelling and prepared the Noise Impact Assessment of a 3.5 MTPA open cut coal mine extension which was integrated into the Ravensworth Operations Environmental Assessment.

Potosi Pit Blasting Assessment and Mitigation, Perilya, Broken Hill Ltd

Rod was instrumental in capturing the field data for the assessment of overpressure and vibration levels from blasting from the development phase of this mine operation. Over a 2 week site visit, Rod cultivated a close working relationship enabling him to fully understand the operation and its unique constraints. Subsequently, Rod went on to develop a blasting emissions management plan for the site. Additionally, noise mitigation from a new type of underground mining truck was also identified to be a significant issue and through measurement and predictive noise modelling the appropriate level of noise mitigation was determined and implemented.

NSW INP/NPI Projects

Since the inception of the Noise Policy for Industry in 2017, Rod has completed multiple noise assessments for a variety of projects throughout NSW such as:

- Built environment projects including service stations and multi use developments;
- Renewable energy projects including 5MW and 100MW solar farms
- Construction Noise and Vibration Assessments;
- Concrete Batching Plants;
- Quarries and Extractive Industry.

Sydney's Desalination Pipeline Project – Construction Noise and Vibration Impact Assessment and Compliance Monitoring

Rod was responsible for noise and vibration impact assessments of 21 construction sites associated with the project during a two year monitoring period.

Dunmore (NSW) Quarry NIA: EIS for a 2.5 MTPA Hard Rock Quarry

Background noise monitoring, criteria assessment, extensive noise modelling and calibration, extensive noise control through modelling, design and measurement. This project also had an extensive continuous noise monitoring program (>3 years) and an ongoing noise compliance program.

Peppertree Hard Rock Quarry, NSW (Boral)

Rod has supported the development of this quarry since 2003 from initial inception through to EIS submission and modification in 2009. Rod conducted detailed noise modelling as part of the quarry engineering design team to evaluate proposed noise mitigation designs and alternative operations of the proposed 2 MTPA hard rock quarry and processing operations in Southern NSW highlands. He has provided ongoing support and technical oversight for operational noise monitoring and management since 2010.

Selected EISA Assessments to IFC Requirements

These projects typically involved the assessment of noise, vibration and blasting emissions and Noise Monitoring and Management Plans; Gaps analysis of EISA and upgrade to IFC standards.

Rod's involvement in these projects ranged from being the Technical Lead and Reviewer to undertaking the modelling and conducting baseline noise surveys.

- Marampa Iron Ore, Sierra Leone, London Mining.
- Tonkolilli Iron Ore, Sierra Leone, African Minerals.
- Allana Potash EISA, Ethiopia.
- Ethiopotash BV (Yara) EISA, Ethiopia.
- Circum Minerals Potash EISA, Ethiopia.
- Corbetti Geothermal Pilot Plant, Ethiopia.
- China Union Bong Mine, Liberia.
- Kiscot Sugar Refinery, Kenya.
- Azzurra Integrated Power Project, Nigeria.
- Sarulla Geothermal Plant, Indonesia – ADB.
- Weda Bay Nickel Mine, Indonesia.
- Ukhaa Khudag Mine (UHG), Mongolia.

Selected Detailed IFC EISA Projects

Simandou Iron Ore, Guinea; Rio Tinto

Rod was Noise and Vibration technical discipline lead for the Simandou Project ESIA located in Guinea, West Africa the world's largest proposed iron ore mine (95 MTPA), including a 700 km railway and deep-water export port.

Marampa Iron Ore Mine, Sierra Leone; London Mining

Rod conducted a gaps analysis of an EISA for this project in terms of the noise and vibration impact assessment for this operational mine. This required further work, undertaking a baseline assessment and predictive noise modelling required for more rigorous (bankable) studies for future operations and expansion including an IFC standard EISA.

Tonkolilli Iron Ore Mine, Sierra Leone; African Minerals.

Rod conducted the baseline noise assessment, noise modelling for an extension of the existing mine including the assessment of a 25 km haul road, 75 km railway line and materials handling facility. Rod was required to undertake a gaps analysis of the existing assessment and update it to a more rigorous (bankable) study for future operations and expansion including an IFC standard EISA.

LNG Processing Plant, Mozambique – Anadarko

Rod was the technical lead managing a specialist team in South Africa undertaking field work and predictive modelling, IFC assessment and development of noise monitoring and management plans.

Sarulla Geothermal Plant – Noise Impact Assessment (2014)

The Sarulla Geothermal Power Project is located in the Tapanuli Utara district, in North Sumatra province, Indonesia. A noise impact assessment for the proposed plant was completed including:

- Review of operational processes and associated emission sources
- Review of third party baseline noise data
- Development of noise criteria
- Noise modelling of various scenarios
- Noise impact assessment and development of project specific mitigation and management procedures.

Ital-Thai – (Mozambique) Rail and Port Development

Baseline Noise Campaign and IFC Noise Impact Assessment for a proposed 650 km railway from the Zambeze basin to the Indian Ocean port development capable of exporting 100 MTPA of coal. Rod was the technical lead for the assessment of potential construction and operational noise impacts associated with a proposed railway, port facility and associated infrastructure for a mine in Mozambique. Work tasks included:

- Review of the railway transportation and port processes and associated emission sources
- Development of noise criteria in accordance with IFC guidelines
- Detailed noise modelling of various construction and operational scenarios
- Development of project specific mitigation and management procedures.

Appendix B - Todoroski Air Sciences CVs



Curriculum Vitae - Aleks Todoroski

Director

- ✦ Telephone: 02 9874 2123
- ✦ Mobile: 0459 787 258
- ✦ Email: atodoroski@airsciences.com.au

AREAS OF EXPERTISE

- ✦ Air Dispersion Modelling
- ✦ Odour Assessment
- ✦ Air Quality Management and Impact Assessment
- ✦ Environmental Noise
- ✦ Meteorology

QUALIFICATIONS & PROFESSIONAL AFFILIATIONS

- ✦ Bachelor of Engineering (Mech) (Newcastle University)
- ✦ Clean Air Society of Australia & New Zealand
- ✦ Australian Acoustical Society
- ✦ Air & Waste Management Association

PROFESSIONAL EXPERIENCE

Aleks has a bachelor degree in mechanical engineering and 25 years of experience in air quality and environmental noise both in consulting and in government.

He worked as general manager at PAEHolmes (now Pacific Environment Limited) for 3 years, where he was responsible for managing the business and the technical work specialist consultants working on air quality projects.

At NSW OEH (DECCW/EPA) he worked for 10 years in the role of principal technical policy adviser in the air policy section and as the assessments manager in the noise and air policy sections. Prior to this Aleks was Principal Engineer Australia in a large environmental consultancy for over 6 years. Throughout his employment, Aleks has been directly involved in the development of significant air and noise policy and in the approval process of many significant projects in NSW.

Aleks has experience in air dispersion modelling, noise modelling, impact assessment and government approval and policy work for various projects in Australia and overseas. He has represented clients and government in significant legal proceedings, commissions of inquiry and public processes.

PROJECT EXPERIENCE (SELECTED PROJECTS)

Environmental Impact Assessments

Mining/Mineral/Quarries

- ✦ Many coal mines including: Mt Thorley Warkworth, Baralaba, Hail Creek, Clermont, Kestrel, Blair Athol, Hunter Valley Operations North and South, Mt Pleasant, Carrington, Bengalla, Boggabri, Maulls Creek, Stratford, Gloucester, Mt Owen, Mangoola, Glendell, Ashton North and South, Wambo, Bulga, Drayton, United, Ravensworth North, East and Underground, Ulan, Moolarben, Wilpinjong, Coalpac;
- ✦ Sand Mines including Ouyen Mineral Sands Deposit, Snapper Mineral Sands Project, Ginkgo sand mine, and other smaller operations
- ✦ Cadia, Peak Hill, RASP, Cowal, Martabe (Sumatra), Lihir and other gold and metalliferous mines;
- ✦ Mt Arthur North coal mine – first significant project per NSW Industrial Noise Policy, results in “world best practice” for noise in mining;
- ✦ Air quality impact assessment Mangoola Mine including assessment of dust generation from Coal Transport;
- ✦ Yarrabee Road quarry;
- ✦ Tottenham Channel Iron Ore Project;
- ✦ BHPBilliton – various mines and processing plant, South Arm remediation project Newcastle, Coal seam methane plant Appin;
- ✦ Boral – numerous hard rock and gravel quarries, cement plants, asphalt plants and material
- ✦ Dixon Sands, PF Formation, and other sand quarries, Maroota;

Odour & Industry

- ✦ Wagga Wagga SAP – Air, Noise and Odour study for planning considerations – Department Planning Industry and Environment;
- ✦ Odour study for precinct planning Camellia Precinct – Department of Planning and Environment;
- ✦ Numerous odour and noise studies carried out for redevelopment of land in the Austral and Leppington area.
- ✦ East Leppington Precinct - study of poultry operations within and surrounding the East Leppington Precinct.
- ✦ Air Quality Review - Dispersion modelling assessment of Methyl Bromide NZ ports – NZ EPA
- ✦ Bomen Industrial Sewage Treatment facility – odour study for City of Wagga Wagga Council;
- ✦ Numerous odour assessments - Moira, Kiacatoo and Rangers Valley cattle feedlots; numerous large chicken farms, e.g. 5 million birds, piggeries, abattoirs, rendering plants, tanneries;
- ✦ Odour assessment rezoning of land to Low Density Residential Bargo.
- ✦ Peer review – air quality assessment: composting facility Nomads Road, Toronto;

- ✦ Blue Circle Southern Cement, Berrima and Maldon works –waste to energy proposals;
- ✦ Cement Australia – Kandos;
- ✦ Incitec Pivot – Ammonium Nitrate Facility Kooragang Island;
- ✦ Orica HCB project –contaminated waste;
- ✦ Orica Kooragang Island, Yarwin;
- ✦ Rhodes peninsula – several contaminated land remediation and construction projects;
- ✦ Amcor - Paper Mill redevelopment, Botany;
- ✦ Shoalhaven Starches – major upgrades and ethanol plant, Bomaderry;
- ✦ Hyne and Son Timber – saw mill, Tumbarumba;
- ✦ Graincorp – grain handling capacity expansion Carrington;
- ✦ Trugain - waste oil reprocessing, Rutherford;
- ✦ TransPacific Industries – oil refining, Rutherford;
- ✦ Bluescope Steel – Colourbond plant Erskine Park, Metserv, Kembla, various upgrades to Kembla works;
- ✦ Incitec Provit Ammonia Nitrate review;
- ✦ Erskine Park – proposed milk producing facility;
- ✦ Caltex, Shell – expansions of oil refinery, low sulphur fuel projects;
- ✦ Boral, Austral, National Ceramics and other brick and tile works.

Transport and infrastructure

- ✦ Review for the Commonwealth of the impact assessment of Sydney airport and the proposed Badgerys Creek Airport;
- ✦ Newcastle Coal Terminal Optimisation and Expansion;
- ✦ Peer Review Northconnex Project, Westconnex M4 East;
- ✦ Westconnex motorway;
- ✦ Sydney Airport;
- ✦ Cross city Tunnel;
- ✦ Lane Cove Tunnel;
- ✦ Numerous upgrades, duplication and by-pass projects for Pacific and Hume Highways;
- ✦ Albury-Wodonga National Highway;
- ✦ Northern Distributor;
- ✦ Eastern Distributor;
- ✦ RTA, Newcastle Council, Lake Macquarie Council and Port Stephens Council – various road construction projects, noise monitoring and modelling, e.g. Industrial Drive Mayfield, Carrington Heavy Vehicle Bypass, Pacific Highway Hexham, Nelson Bay Road, various roundabouts and road realignments in the Hunter Valley;

- ✦ Extensive noise barrier/ mitigation design for various freeway and highway projects in QLD;
- ✦ Tallawong Road Rail Depot;
- ✦ Moorebank Intermodal Project;
- ✦ State Rail Authority – St Mary’s intermodal terminal;
- ✦ CRT Yennora – distribution centre;
- ✦ Carnival Cruises – various assessments;
- ✦ Sydney Ports – Port Botany expansion, Enfield intermodal terminal, White Bay expansion;
- ✦ Newcastle Port Corp - Carrington Basin expansion;
- ✦ Very High Speed Train proposal;
- ✦ Mt Arthur North Antiene Rail Loop, Wambo Rail Loop;

Audits

- ✦ Various mines including; Mt Arthur, RASP, Mangoola, Boggabri and Tarrawonga.
- ✦ NSW Mineral’s Council response to NSW EPA audit of NSW coal mines;
- ✦ Various specialist audits of sand mines, hard rock quarries, waste and land filling operations, industrial and other activities for the NSW EPA Compliance Audit section.

On-site environmental management projects

- ✦ Abigroup - environmental supervisor for 18km duplication of Pacific Highway project;
- ✦ John Holland Construction and Engineering - Bridge over Hunter River;
- ✦ Daracon Engineering - 5km multi-lane section of New England Highway;
- ✦ Abigroup- infrastructure for Bengalla coal mine;
- ✦ Pacific Power - long-term study of fluoride concentrations in Hunter Valley vegetation;

Ambient air quality monitoring

- ✦ Envirosciences - Manage 40 Hi-Vol and PM10 samplers, develop calibration procedures – near 100% deployment of ambient monitoring equipment at many varied sites across Australia;
- ✦ Numerous Hunter Valley mines - Hi-Vol, DDG, Coal dust and metals;
- ✦ PWCS Kooragang – operate air quality monitoring network, Hi-Vol, PM10, Depositional Dust Gauges and directional ambient air quality sampling;
- ✦ BHP Steel Mayfield – various ambient air quality monitoring surveys for dust, metals, speciated VOC, asbestos;
- ✦ BHP Shipping – explosive aerosols;
- ✦ Koppers, Beresfield, fugitive air emissions from timber treatment including odour, speciated VOC, Copper, Arsenic;

- ✦ Numerous small industrial plants and materials handling operations;
- ✦ Abigroup/Hunter water - odour and taste of Newcastle's water supply.

Stack emissions testing and odour sampling

- ✦ Incitec, Kooragang Island - trials for new ammonium process.
- ✦ RTA - Sydney Harbour Tunnel;
- ✦ Australian Paper Mills, Botany;

Contaminated site assessment/ remediation projects

- ✦ Thiess - remediation projects Rhodes, Orica, Villawood and other sites;
- ✦ Sydney Harbour Federation Trust - former gas works and naval site at Milson's Point
- ✦ BHPBilliton - former Newcastle BHP steel works, gas works, harbour and associated projects
- ✦ Monier/CSR, Cardiff - Remediation of former roof tile manufacturing site;
- ✦ Ampol, Hamilton - on site remediation of former service station, noise and air quality considerations in designing treatment system;
- ✦ Pacific Power, Cessnock - remediation of former power station/ gasworks site;
- ✦ Lake Macquarie City Council/ Pasminco, Cockle Creek – lead contamination of residential areas – L&E court reports;
- ✦ Newcastle Metal Recyclers - site sampling and validation.
- ✦ Ethylene oxide/ propylene oxide emissions at Unomedical, Steritech and others – represent DECC at high level, make appropriate on-the-spot decisions, provide sound advice and guidance under pressure;
- ✦ Resolve excessive dioxin emission issues at Orica;
- ✦ Waste-to-energy, Greenpeace/ community concern at Blue Circle Southern cement;
- ✦ Various matters related to road tunnel air emissions in Sydney;
- ✦ Resolving issues between Treasury/ DECC related to NSW Energy Generators;
- ✦ The NW and SW development of Sydney – resolve air quality issues with developers, Growth Centres Commission, Landcom, Sydney Water and others.

Appendix C - EMM Consulting CVs

Pamela Kottaras

Associate, National Technical Leader, Historical Heritage

Curriculum vitae

Pamela has over 20 years' experience as an archaeologist and heritage consultant across infrastructure, mining, energy and property development and construction. She has managed numerous projects requiring assessment and resolution of the impact on Aboriginal and historical heritage sites. Her work covers complex historical assessments and heritage impact statements, Aboriginal heritage assessments, site analysis, archival recording, heritage statutory planning and policy review, and excavation and survey planning and supervision.

Pamela works closely with historic and Aboriginal heritage communities, government agencies and clients. She has held co-director positions on a number of archaeological excavation projects for SSI approvals as well as on s140 permits and sole excavation director on s60 permits. She has partnered with Macquarie University to mentor emerging professionals and contributes to the teaching consulting skills to students.

Qualifications

- Bachelor of Arts (Hons) majoring in Prehistoric and Historical Archaeology, University of Sydney, 1997
- Laboratory Technician Certificate, Sydney Technical Collage, 1987
- Australian Society for Historical Archaeology – full member since 2004
- Australia ICOMOS Inc – full international member since 2005
- Board member on the Macquarie University Ancient Cultures Research Centre, now the Centre for Ancient Cultural Heritage and Environment since 2015
- Rail Industry Worker qualified
- White Card qualified
- Four-wheel driver training

Career

- EMM Consulting, 2013–present
- Team Leader Cultural heritage, Biosis, 2009–2013
- Manager, Austral Archaeology, 2007–2009
- Consultant, Austral Archaeology, 2004–2009
- Heritage Consultant, City Plan Heritage, 2002–2004
- Research Assistant, Otto Cserhalmi & Partners Architects, 2001–2002
- Research assistant, Heritech Consulting, 1998–2001

Representative experience

Mining and resources

- Hume Coal Project, historical heritage assessment and statement of heritage impact lead, Berrima (Hume Coal)
- Berrima Rail Project, historical heritage assessment and statement of heritage impact lead, location (Hume Coal)
- Peppertree Quarry, Aboriginal Salvage excavation field work and reporting co-director, Marulan South (Boral)

- Marulan South Limestone Mine Continued Operations Project, historical heritage assessment and statement of heritage impact lead, Marulan South (Boral)
- AGL Camden Gas Project, historical heritage assessment, Camden (AGL)

Roads and rail

- Sydney Metro North West, excavation co-director, historical archaeological assessments and excavation programs for Cherrybrook, Castle Hill, Showground and Kellyville Station and viaduct sites and White Hart Inn, Sydney NSW (Transport for NSW)
- Pitt Town Bypass Preliminary Environmental Investigation (lead, non-Aboriginal heritage chapter), Pitt Town (Roads and Maritime Services)
- Windsor Bridge Replacement Project, historical heritage statement of heritage impacts lead, archaeological test excavation and landscape design input, Sydney NSW (Roads and Maritime Services)
- Windsor Bridge Options Study, assessment of historical heritage constraints, Sydney NSW (RTA)
- Grafton Bridge Duplication Project, non-Aboriginal heritage constraints reports and options report, Grafton NSW (Roads and Maritime Services)
- Grafton Bridge Duplication Project, non-Aboriginal heritage environmental assessment report, Grafton NSW (Roads and Maritime Services)
- Hume Highway Bypass at Tarcutta Unexpected Finds Reports, Regional NSW (RTA)
- Hume Highway Bypass at Tarcutta, archival record of Hambledon Homestead, Humula, Tarcutta Cemetery, Regional NSW (RTA)
- Great Western Highway Upgrade, Lawson, heritage construction management plan and heritage management report, Regional NSW (RTA)
- Nundah Bank Third Track, historical heritage assessment and statement of heritage, Singleton (Australian Rail Track Corporation)
- Erskine Park, Aboriginal Archaeological Salvage Excavation and project management, Sydney NSW (RTA).
- RTA Heritage and Conservation Register Update, analysis and history, Sydney NSW (RTA).

Urban growth and development

- Dubbo Hospital Redevelopment Project; unexpected finds assessment for Hansen Yunken on behalf of Savills Australia
- New Life residential development Pyrmont, archaeological assessment and salvage excavation, Sydney NSW: Excavation co-director (TWT Developments)
- Dubbo Hospital Redevelopment Project; historical archaeological baseline assessment for Savills Australia
- Garden Island archival recording project, Sydney NSW (Lendlease for Defence)
- North-West Growth Centre, heritage assessment, Sydney NSW (Sydney Water Corporation)
- Proposed Holroyd Substation, Aboriginal archaeological and cultural assessment, Sydney NSW (Transgrid)

Water infrastructure

- Pipehead and Potts Hill Reservoirs, statement of heritage impacts, Sydney NSW (Transgrid)
- Stevens Weir Deniliquin, statement of heritage impact, Regional NSW (State Water)
- Gogeldrie Weir and Yanco Old Weir, statement of heritage impact and exemption notification, NSW (NSW State Water, Leeton Branch).
- Edmondson Park Wastewater Planning Study, Aboriginal and historical risk assessment, Sydney NSW (Sydney Water)
- Spring Farm Trunk Main, Aboriginal test excavation and project management, Sydney NSW (Networks Alliance)

Conservation

- Sydney Metro North West, conservation of the White Hart Inn and listing on the State Heritage Register, Sydney NSW (Transport for NSW)
- Eveleigh Locomotive Workshop conservation management plan, Sydney NSW (Otto Cserhalmi and Partners)
- Eveleigh Carriageworks, conservation management plan, Sydney NSW (Otto Cserhalmi and Partners)
- Linnwood Estate, conservation management plan (archaeological component), Liverpool (City Plan Heritage for Council)
- Goat Island, conservation management plan (archaeological components), Sydney NSW (National Parks and Wildlife Service)

- White Bay Power Station, peer review of conservation management plan endorsements, White Bay (NSW Heritage Council)
- Fort Scratchley Historic Site, peer review of conservation management plan endorsements, Fort Scratchley (NSW Heritage Council)
- Wallah and Moonee Collieries, peer review of conservation management plan endorsements, Newcastle (NSW Heritage Council)
- Dyke Point, peer review of conservation management plan endorsements, Dyke Point (NSW Heritage Council)
- Blue Mountains Tracks Into History, peer review of conservation management plan endorsements, Blue Mountains (NSW Heritage Council)
- Sewage Pumping Station SP0271, peer review of conservation management plan endorsements, Marrickville (NSW Heritage Council)
- Sewage Pumping Station SP0038, peer review of conservation management plan endorsements, Mascot (NSW Heritage Council)



Servicing projects
throughout
Australia and
internationally

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Ryan Desic

Associate Archaeologist – Heritage Team Leader
BA (hons) Prehistoric and historical archaeology

Curriculum vitae

Ryan is an archaeologist with over 10 years' experience in the heritage consulting industry.

Ryan has led a number of major Aboriginal and historic archaeological investigations across renewable energy, infrastructure, and extractive industries.

Ryan is experienced in the preparation of complex Aboriginal cultural heritage assessment reports requiring up-front risk management and Aboriginal consultation processes.

Ryan is focused on de-risking projects by offering up-front strategies for positive heritage outcomes that benefits both clients and stakeholders.

As heritage team leader, Ryan advocates learning and development in technology and innovation, using digital recording and drone photography formats.

Qualifications

- Bachelor of Arts (Hons) in Prehistoric and Historical Archaeology, University of Sydney, 2009
- Australian Archaeological Association (AAA) – member
- Occupational Health and Safety construction induction White Card NSW, 2008
- Senior First Aid training
- 4WD training certificate

Career

- EMM Consulting, 2012–present
- Archaeologist, subcontractor 2008–2012

Recent representative experience

Aboriginal heritage

- Cowal Gold Operations, Aboriginal heritage salvage works under Aboriginal Heritage Management Plan, Lake Cowal NSW (CGO Operations)
- Snowy Hydro 2.0, project manager for heritage technical specialist studies, Snowy Mountains NSW (Snowy Hydro)
- New England Solar Farm Project, Aboriginal cultural heritage assessment, Uralla/Armidale NSW (UPC Renewables Pty Ltd)
- New England Solar Farm Project, Aboriginal Heritage management Plan, Uralla/Armidale NSW (UPC Renewables Pty Ltd)
- Tahmoor Coal Long Walls West 1–4 Aboriginal cultural heritage assessment, Tahmoor NSW (Tahmoor Coal).
- Tahmoor Coal Aboriginal Heritage Management Plan for Long Walls West 1–4 Extraction Plan (Tahmoor Coal)

- Mole River Dam CSSI Project Aboriginal cultural heritage assessment, Tenterfield NSW, (WaterNSW)
- Dungowan Dam CSSI Project Aboriginal cultural heritage assessment, Tamworth NSW (WaterNSW)
- Burrawang to Avon Tunnel, Aboriginal cultural heritage assessment, Robertson NSW (WaterNSW)
- Menangle Quarry Extension Project, Aboriginal cultural heritage assessment, Menangle NSW (Benedict industries)
- Menangle Quarry Extension Project, Aboriginal heritage management plan, Menangle NSW (Benedict industries)
- Gunlake Quarry Extension Project, Aboriginal cultural heritage assessment, Marulan NSW (Gunlake Quarries)
- Gunlake Quarry Extension Project, Aboriginal Heritage Management Plan, Marulan NSW (Gunlake Quarries)
- Peppertree Quarry, Aboriginal Heritage Management Plan, Marulan South NSW (Boral Property Group)
- Hume Coal Project, Aboriginal cultural heritage assessment, Moss Vale NSW (Hume Coal)
- Berrima Rail Project, Aboriginal cultural heritage assessment, Moss Vale NSW (Hume Coal)
- Bourke Abattoir Project, Aboriginal cultural heritage assessment, Bourke NSW (Saran Engineers)
- Bourke Abattoir Project, Heritage Management Plan, Bourke NSW (Saran Engineers)
- Marulan South Limestone Mine, Aboriginal cultural heritage assessment, Marulan South NSW (Boral Property Group)
- Orange Grove Sun Farm, Aboriginal cultural heritage assessment, Gunnedah NSW (Overland Renewables)
- Cobbora Coal Project, Aboriginal cultural heritage test excavation report, Cobbora NSW (Cobbora Holding Company)



Servicing projects
throughout
Australia and
internationally

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Appendix D - Advisian CVs



Michael Butcher

Principal Water Resources Engineer

Overview

Mining industry water management expert, with over 20 years engineering, management and consulting experience driving responsible water use and reducing environmental risk. Skilled in strategy development and project implementation in situations where responsible water management is critical for business success and fundamental to social licence to operate. Collaborative team leader able to work across different cultures and situations to resolve challenges that have commercial, environmental and social elements. Michael holds Consultant Accreditation with the Alliance for Water Stewardship and is co-author of Minerals Industry Water Stewardship Handbook.

Areas of Expertise

- Water stewardship
- Leading practice water management
- Mine water balance and system optimisation
- Water risk assessment
- Environmental assessment
- Novel environmental solutions
- Environmental data analysis
- Stakeholder engagement

Relevant Experience

Hydrology Lead | Independent Dam Safety Review | MPMG | Brazil | 2019 - 2021

Appointed by the State of Minas Gerais Government to independently verify the condition of dams and provide oversight of upgrade works to guarantee the safety of people and the environment. Working with a team of international experts to assess dam safety, identify required improvements to reach an acceptable safety standard, observation of remedial works and observation of performance over a 12-month period. Critical review of engineering basis of design, applicable standards, construction records, performance monitoring data, management systems and routine reporting.

Mine Water Management Lead | Independent Monitor | Northern Territory Government | NT | 2020 - 2021

Appointed to provide independent oversight of environmental and social performance of the McArthur River Mine. The Independent Monitor provides critical assessment of the activities of the

Mine Operator and the Regulator, reporting on the status on mine's environmental compliance to the Northern Territory Government and local community. Worked with team of experts to assess compliance with regulatory requirements, identification of environment risks, evaluation effectiveness of regulatory measures and opportunities for improved environmental outcomes.

Environmental Engineer | Surface Water Assessment | Mine Expansion | 2018 - 2020

Surface water assessment as part of the approval process for a mine and processing facility expansion in the NSW southern highlands. Responsible for development of a Goldsim water balance model to assess future water requirements and risks as the mine expands over the project life. The model incorporates climate variability, production schedules and landform evolution to determine daily water demand, surface water flow and water storage probability. Monte carlo analysis was completed to determine probability of extraction rates, storage volumes and stormwater release over the project life. Flexibility in the model also allowed for evaluation and optimisation of alternate water management configuration and strategies.

Environmental Engineer | Surface Water Assessment | Proposed Coal Mine Development | 2018 - 2020

Surface water assessment as part of the approval process for a proposed 10Mtpa coal mine and processing facility in northern NSW. Responsible for development of a Goldsim water balance model to assess future water requirements and risks as the mine expands over the project life. The model incorporates climate variability, river allocations, production schedules and landform evolution to determine daily water demand, licenced extraction, surface water flow and water storage probability. Monte carlo analysis was completed to determine probability of extraction rates, storage volumes and stormwater release over the project life. Flexibility in the model also allowed for evaluation and optimisation of alternate water management configuration and strategies.

Principal Consultant – Water Resources | Mine Water Balance | Karara Mining Limited | WA | 2019

Review of mine water balance monitoring and water account for the Karara Iron Ore Mine and Processing Facility, located approximately 300 km northeast of Perth. Project involved assessment of water balance monitoring and accounting against the Minerals Council of Australia Water Accounting Framework, identifying opportunities to improve the monitoring system and options to improve water management performance.

Lead Engineer | Surface Water Hydrology Assessment | TNG Limited | NT | 2019

Preparation of the Surface Water Hydrology Assessment for a proposed Magnetite Concentrate Processing Facility Mineral Processing Facility, located approximately 10 km south of Darwin. The objective of the project is to assess potential impacts of the proposed project on surface water hydrology as part of the project Environmental Impact Statement. Project involves characterisation of the baseline conditions, assessment of potential impacts and development of mitigation measures for surface water aspects of the project. Surface water hydrology assessment works are currently underway.

Lead Environmental Engineer | Drainage, Erosion and Sediment Control Plan | TNG Limited | NT | 2019

Development of a preliminary Drainage, Erosion and Sediment Control Plan for the proposed Mount Peake Project, located 235 km north-northwest of Alice Springs. The plan was prepared to meet the requirements of the Environmental Impact Statement Terms of Reference. The project involved developing a framework for the management of drainage, erosion and sediment during construction, operation and closure phases of the Project.

Environmental Engineer | Erosion and Sediment Control Planning | Wafi-Golpu Joint Venture | 2018

Provision of Erosion and Sediment Control advice and documentation for the proposed Wafi-Golpu gold mine in Papua New Guinea. Worked with project owners to develop design documentation to ensure that specific erosion and control measures are planned and implemented at all stages of the project development, including work conducted by local contractors. Project also included sizing erosion and sediment control basins to control runoff from planned for waste rock dumps, mine infrastructure, roads and quarries in steep terrain and high rainfall conditions. Utilising existing infrastructure and staging of planned construction activities resulting in smaller sediment basin requirements and reduced requirements for additional land disturbance.

Environmental Engineer | Surface Water Assessment | Quarry Expansion | 2018

Surface water assessment as part of the approval process for modifications to a quarry and building products facility in western Sydney. Responsible for development of a Goldsim water balance model to assess future water requirements and risks as the quarry expands over the project life. The model incorporates climate variability, production schedules and landform evolution to determine daily water demand, surface water flow and water storage probability. Monte carlo analysis was completed to determine probability of storage volumes and stormwater release over the project life. Flexibility in the model also allowed for evaluation and optimisation of alternate water management configuration and strategies.

Environmental Engineer | Return Wastewater Study | Coal Terminal | 2017

Study to understand and resolve water management issues resulting from heavy rainfall and/or coal spills at a coal terminal in a sensitive marine environment. Responsible for review and update of the Goldsim water balance model, assessment of current system performance and evaluation of changes to system design and operation. Monte Carlo analysis of the wastewater system was completed using different rainfall intensity/durations, coal spill scenarios, improvement options and control logic to determine the most effective means of reduce the risk of overflow from sumps on the coal terminal. Study also identified interim actions that would immediately reduce the risk of overflow until the additional equipment was installed.

Environmental Engineer | Topsoil Review | Coal Mine | 2017

Project involving a critical review of topsoil management for a mine undertaking a large rehabilitation campaign. Responsible for developing project proposal, site inspection, analysis, mapping, developing solutions and reporting. The review provided practical advice to improve the grazing value of rehabilitated landforms, identified risks with their current plan and provided options to reduce long-term risk of meeting the agreed mine closure plans.

Project Manager | Regional groundwater analysis | 2017

Project involving a regional groundwater analysis for a minerals exploration program. Responsible for collation of available data, characterization of groundwater systems and synthesis into a short report meant that the company could avoid higher risk areas, develop contingency plans and provide important information about local groundwater to landholders during exploration activities.

Project Manager | Mine Water Balance Review | Cadia Gold Mine | 2017

Project involving a review of mine water balance, identification of options for improvement, supply forecasting and risk analysis for a water intensive mining operation in fully developed catchment. Responsible for review and update of Goldsim water balance, development of water account, analysis of system performance, identification of risk and recommending options for improvement. Probabilistic water forecast, and analysis was completed to determine the impact of climate variability and demand uncertainty. This provided mine management with quantitative measures of water risk to help optimize water management decisions for the following year to ensure adequate water supply, reduce risks associated with flooding and minimize water costs.

Environmental Engineer | Erosion and Sediment Control Plan | Bauxite Mine Development | 2017

Project involving the development of erosion and sediment control strategy and plans for a time constrained large mining project development in an extremely variable climate. Responsible for determining erosion and sediment control requirements, drafting of plans and scheduling analysis. The timing of initial disturbance and ultimate control structures meant that temporary control could be minimized while erosion and sediment risk was managed according to necessary standard.

Project Lead | Cadia long-term water strategy | Cadia Gold Mine | 2016

Project involving the development of the long-term water management strategy based on water stewardship principles. Responsible for scoping, contract management, stakeholder engagement and presentation to company executive. An inclusive approach in developing the strategy meant that the business case for implementing the strategy included all the aspects of why water management was important to the business, including the community, environment and commercial aspects. The strategy informs initiatives and investment decisions to ensure responsible water management over the next 50 years of operations at the site.

Water Study Lead | Mine expansion feasibility study | Cadia Gold Mine | 2016

Project involving the development of water management solutions and quantification of water risk for incremental production rate increases at the Cadia Gold Mine from 35 to 100 million tonnes per annum as part of mine expansion feasibility study. Responsible for project scoping, contract management of water balance model update, risk analysis, reporting, third party review and presentation of results. Water balance modelling was used to determine water risk over the project life and quantified project financial risks.

Industry Expert | Minerals Industry Water Stewardship Handbook | Leading Practice Sustainable Development Program | 2015 – 2016

Expert member of the working group that wrote the Minerals Industry Water Stewardship Handbook. The handbook is an Australian Government initiative to promote sustainable development through proactive adoption of leading practice principles, with recommendations from the Minister for Foreign Affairs, the Hon Julie Bishop MP and Minister for Resources, Energy and Northern Australia, the Hon Josh Frydenberg MP.

Program Lead | Water management improvement program | Cadia Gold Mine | 2008 – 2016

Developed, implemented and coordinated water management improvement programs over 9 years. Responsible for coordinating the multi-disciplinary team, risk assessment, water forecasting, system performance analysis and reporting. The improvements in site water efficiency and water management avoided a production interruption during the millennium drought, which would have resulted in a material loss in revenue for the company.

Senior Environmental Engineer | Cadia Gold Mine | 2008 – 2016

Responsible for environmental monitoring, assessment, management and reporting function at the mine. Led site efforts to resolve environmental management challenges including water supply shortage, stormwater management, operational noise, fugitive dust emissions, changes in groundwater levels around the mine, environmental impact assessment of expansion proposals, expansion of environmental monitoring work and consistent reporting of environmental performance to stakeholders.

Senior Environmental Engineer | Alumbrera Mine | 2005 - 2006

Responsible for mine closure planning and acid mine drainage management at the Alumbrera Copper/Gold Mine in Argentina. Led site efforts to develop a functional mine closure plan, highlighting challenges associated with material movements to achieve final landforms and long-term management of acid forming mine waste.

Geotechnical Supervisor | Galore Creek Project | British Columbia | 2004 – 2005

Responsible for collection of geotechnical data as part of mineral exploration program.

Environmental Advisor | Mount Isa Mines | 2001 – 2004

Responsible for environmental monitoring data collection, reporting and projects to reduce environmental impacts. Projects included design and construction of stream gauging for the Leichardt River, assessment of historical tailings contamination, design and construction of sediment control structures.

Qualifications & Affiliations

- Bachelor of Engineering in Environmental Engineering (Honours), University of NSW
- Member Institute of Engineers Australia
- Mineral Council of Australia Water Working Group member 2008-2016

Publications/Presentations

- Minerals Industry Water Stewardship Handbook, Australian Government, May 2016
- "Water stewardship – a practical handbook for operation" - Water in Mining – 5th International Congress on Water Management in Mining, May 2016
- "Securing access to water – challenges and opportunities" – Oz Water 2013 – Australia's Water Association Water Conference and Exhibition, May 2013
- "Continuous Improvement in Water Management at Cadia Valley Operations" – Minerals Council of Australia Sustainable Development Conference, 2009

Work History

2017 to Current	Water Resources Engineer, Advisian, Brisbane
2017 (Jan – Jun)	Principal Environmental Engineer, O2 Environment + Engineering, QLD
2008 to 2016	Senior Environmental Engineer, Cadia Gold Mine, NSW, Newcrest
2007	Environment and Systems Coordinator, Wilpinjong Coal Project, NSW, Thiess
2005 to 2006	Environmental Advisor, Alumbrera Mine, Argentina, Xstrata (now Glencore)
2004 to 2005	Geotechnical supervisor, Galore Creek Mine Exploration Project, Canada, Novagold
2001 to 2004	Environmental Advisor, Mount Isa Mines, QLD, MIM (now Glencore)

Appendix E - Australasian Groundwater & Environmental Consultants CVs



James Tomlin

Director | Principal Hydrogeologist | Project Lead

Education

- Bachelor of Science (Environmental Studies), Griffith University, Brisbane, Qld, 1992
- Master of Science (Hydrogeology), University of Technology, Sydney NSW, 1999
- Certificate of Science (Geology), James Cook University, Townsville, Qld, 2001

Memberships

- International Association of Hydrogeologists, Member, Australian Chapter

Employment history

Jan 2000 – Current	Australasian Groundwater and Environmental Consultants Pty Ltd Director Principal Hydrogeologist Project Lead
1999 – 2000	Gutteridge Haskins and Davey Environmental Consultant
1998 – 1999	University of Technology, Sydney Masters student
1996 – 1997	Geraghty & Miller International Inc. Cambridge, England Environmental consultant
1994 – 1996	OTEK Australia Pty Ltd, Brisbane, Qld Environmental consultant
1993 – 1994	Department of Environment and Heritage, Brisbane, Qld

Skills

James Tomlin is a Principal and Director of Australasian Groundwater and Environmental Consultants Pty Ltd (AGE). He has a BSc and MSc in Hydrogeology and Groundwater Management and 25 years' experience in the consulting industry. Over the last 19 years with AGE, James has concentrated on delivering groundwater investigations to support feasibility studies and environmental approvals for the resource and government sectors. His skills include:

- identifying key risks and data gaps for projects;
- designing cost effective field programs to collect essential data;
- developing conceptual models of groundwater regimes;
- guiding the development of numerical models;
- advising clients on legislative requirements relating to groundwater;
- preparing technical reports that meet the requirements of all stakeholders; and
- presenting to clients, regulators and landholders.

Areas of expertise and selected project experience

James has broad experience and over the last ten years James has focussed on providing advice to the mining industry, particularly the coal sector. He has experience investigating and reporting on groundwater regimes in all the major mining districts of Eastern Australia including Galilee Basin, Bowen Basin, Surat Basin, Gunnedah Basin, Hunter Valley and Southern Coalfields. Outside of the coal sector, James has investigated groundwater issues associated with coal seam gas, metalliferous mines, hard rock and sand quarrying and developments including dams, tunnels, landfills and industrial projects. Some examples of his project experience are provided below.

Mining Projects

- Dartbrook mine, NSW, Groundwater assessment for MOD7 (2020)
- Glendell Mine Continued Operations, NSW, Groundwater assessment (2018-2020);
- Hunter Valley Operations, NSW, Groundwater assessment for PFS study (2018/2019);
- BTM Mining Complex, NSW, Numerical model update (2019-2020);
- Cadia Mine, NSW – Cadia Hill Pit Tailings assessment MOD13 (2019);
- United Wambo Project, NSW – Responses to Independent Planning Commission (2019);
- Mount Owen Mine, NSW, SEE report (2017/2018);
- Groote Eylandt, NT, new quarry baseline site groundwater assessment (2018/2019);
- Watermark Project, NSW, Water Management Plan (2017-2020);
- Mangoola Mine Continued Operations, NSW, GIA and response to submissions (2018-2020);
- Newlands Mine, Groundwater Assessment Peer Review (2019);
- Aquila Longwall Mine, Groundwater Assessment (2018-2019);
- Integra Mine, NSW, MOD8 Groundwater Assessment (2017);
- Callide Mine, Qld, various groundwater advice (2014-2018);
- Ironbark Project, Qld, Advice for regulators (2018);
- Hunter Valley Operations Mine, Annual reviews (2017);
- Bylong Coal Project, NSW, Gateway/EIS reports/PAC presentation (2012-17);
- Maules Creek Coal, NSW, EIS investigation and ongoing model updates (2010-17);
- Berrima Colliery, NSW, EIS hydrogeological investigation (2010);
- Boggabri Coal Mine, NSW, EIS hydrogeological investigation and model updates (2008-2018);
- Warkworth Mine, NSW, EIS hydrogeological investigation (2009-2010);
- Narama Mine, NSW, Study for modification to open cut mine (2012);
- Watermark Project, NSW, EIS and annual reviews (2010-2017);
- Cullen Valley Mine, NSW, EIS hydrogeological investigation (2010-11);
- Wilpinjong Mine, NSW, Review of Cumbo Creek diversion (2010-11);
- German Creek Mine, Qld, Investigate new longwall mine (2013);
- Gregory Crinum Mine, Qld, Closure study (2013);
- Norwich Park Mine, Qld, Final void study (2013);
- Minyango Project, Qld, EIS and approvals support (2011-13);
- Wards Well Project, Qld, EIS investigation (2010-2012);
- Wilunga Project, Qld, EIS investigation (2011);
- Newlands Mine, Qld, EIS approvals and mine planning support (2010-2017);
- Togara North Project, Qld, Feasibility Study and EIS (2009-2010);
- Sarum Coal Project, Qld, Feasibility Study and EIS (2008-2010);
- Colton Coal Mine, Qld, EIS hydrogeological /modelling (2008-2010);

Areas of expertise and selected project experience (continued)

- Elimatta Project, Qld, EIS hydrogeological investigation and updates (2008-2017);
- Ellensfield Project, Qld, EIS investigation/modelling, Vale (2008);
- Blackwater Mine, Qld, Hydrogeological review (2008);
- Saraji Mine, Qld, Data review/ongoing advice (2007-2012);
- Carborough Downs, Qld, EIS investigation/modelling (2006);
- Sonoma Mine, Qld, EIS and approvals support (2005-06);
- Ensham Mine, Qld, Various ongoing advice, bores installation and monitoring (2004-2018); and
- Wilke Creek Mine, Qld, Hydrogeological review (2003).

Quarries

- Bajool Limestone Quarry, Qld, Groundwater management plan (2018);
- Innes Park Basalt Quarry, Qld, Hydrogeological investigation (2009-2010);
- Dundowran Quarry, Qld, Hydrogeological investigation (2006);
- Narangba Quarry, Qld, Hydrogeological investigation (2006);
- Petrie Quarry, Qld, Hydrogeological investigation (2006);
- Roseneath Quarry, Qld, Hydrogeological investigation (2007); and
- Bracalba Quarry, Qld, Permeability testing (2003).

Government

- Queensland Govt, Review of Guideline quantifying the volume of associated water taken under a mining lease or mineral development licence (2016);
- Queensland Govt, Review abandoned coal bores in Surat Basin for OGIA (2013); and
- Queensland Govt, Guideline for farm bore surveys for DNRM (2010-2011).

Coal Seam Gas and Oil Shale

- Arrow Energy Gas Fields, Qld, Bore Assessment for four bores (2017);
- Meridian Gas Field, Qld, Groundwater assessment (2010-2011); and
- Stuart Oil Shale Project, Qld, Data review and bore design (2011-2012).

Mineral/Sand Mines

- Lawnton Sand Mine, Qld, Desktop review change of land use (2009);
- Cape Cleveland Sands, Qld, Investigation/numerical modelling (2004);
- Carbrook Sand Mine, Qld, Assessment monitoring data (2006);
- Norwell Sand Mine, Qld, Investigation and modelling (2004); and
- Cudgen Sand Mine, Qld, Hydrogeological study /modelling (2006-2017).

Gold/Base Metal Mines

- Mt Oxide Mine, Qld, EIS investigation (2010-2011);
- Cadia Mine, NSW, Various hydrogeological investigations (2006-2018);
- Kidston Gold Mine, Qld, Stage 1 & 2 contaminated land study (2001);
- Cracow Mine, Qld, Klondyke EMOS and bore installation (2003);

Areas of expertise and selected project experience (continued)

- Endeavour Mine, NSW, Permeability testing for tailings storage (2004);
- Osborne Mine, Qld, Contaminated land assessment (2005); and
- Cadia Mine, NSW, Investigation and bore installation (2007-2008).

Water Supply Investigations

- Wilpinjong Mine, NSW, Supervision of water supply bores (2007);
- Swickers Abattoir, Qld, Water supply assessment (2013);
- Surat Basin, Qld, Water supply for 2 x gas camps (2011-2012);
- Oaky Creek RWS, Qld, Monitoring and bore rehabilitation (2007);
- Wilpinjong Mine, NSW, Installation production bores (2007);
- Town of Clairview, Qld, Pumping test assessment (2003);
- Mundubbera Feedlot, Qld, Water supply options (2004);
- Burnett River Dam, Qld, Aquifer monitoring (2004-2008);
- Auburn Feedlot, Qld, Pumping test assessment (2005); and
- Callide Mine, NSW, Installation level & flow loggers (2007).

Development sites

- Gold Coast Retirement Village, Qld, Review groundwater issues (2014);
- Purga Area, Qld, Groundwater impact assessment (2005); and
- Nestle Coffee Gympie, Qld, Waste water irrigation review (2007).

Tunnelling

- Epping Tunnel, NSW, Analytical inflow estimates (2001);
- Cross City Tunnel, NSW, Analytical inflow estimates (2003);
- Airport Link, Qld, Pump testing and inflow estimates (2005); and
- Clem 7 Tunnel, Qld, Pump testing and monitoring (2005/6).

Landfill Sites

- Redcliffe City Council, Qld, East Talobilla Park, LRAP Investigations (2001);
- Redcliffe City Council, Qld, Western Talobilla Park, Installation Monitoring Bores (2001);
- Redcliffe City Council, Qld, Redcliffe, Post Closure Monitoring Plans (2002);
- Whitsunday Council, Qld, Jubilee Pocket, Monitoring and Spec for Capping (2002);
- Caboolture Council, Qld, River Road Landfill, Hydrogeological Investigation (2003);
- Noosa Council, Qld, Noosa Heads Landfills, Monitoring Bores and Monitoring (2003);
- Noosa Council, Qld, Noosa Heads Landfills, Numerical Modelling (2003);
- Rosalie Shire Council, Qld, Rosalie Area, LRAP Investigation (2003);
- Kingaroy Shire Council, Qld, Kingaroy Landfill, Hydrogeological Investigation (2006);
- Noosa Council, Qld, Noosaville Landfill, Hydrogeological Assessment (2006);
- Coolool Shire Council, Qld, Four Landfill Sites, LRAP Investigations (2007); and
- Redcliffe City Council, Qld, Redcliffe Landfills, Water Quality Monitoring (2007).

Areas of expertise and selected project experience (continued)

Dams

- Lake Kinchant Dam, Qld, Management of investigation on neighbouring property.

Petrochemical Industry

- Kuwait Oil Fires, Qld, Installation monitoring network, Kuwait Government (2002-2004);
- Bulk Petrol Terminal, Qld, Groundwater monitoring, Neumann Petroleum (2001-2008); and
- Contaminated land investigations at multiple petrol stations and terminals in Australia and the UK (1994 to 1999).

Community consultation

- Present to residents surrounding Boundary Hill South Project for Callide mine, 2015
- Present to residents surrounding Cadia Mine 2018, 2019

Conference presentations

- Expert panel member on mining and coal seam gas - Australian Groundwater Conference, 2019, Brisbane.
- Tomlin, JS 2015. Final voids lakes at open cut coal mines – a perspective on the challenges and opportunities. Australian Groundwater Conference, 3–5 November 2015, Canberra.
- Presenter at “Getting to Know Your Groundwater” workshop for landholders in Emerald Queensland coordinated by 4T consultants, April 2016

Education

- MSc in Hydrogeology (Cum Laude), University of the Free State, South Africa, 2003-2004
- BSc Honours in Hydrogeology and Hydrology, University of the Free State, South Africa, 1998
- Master's in environmental management, University of the Free State, South Africa, 1999
- Bachelors in Geography and Business Economics, University of the Free State, South Africa, 1996

Memberships

- International Association of Hydrogeologists, Member, Australian Chapter
- Groundwater Division of GSSA (Geological Society of South Africa)
- Certified Professional Natural Scientist (Pr.Sci.Nat) 400386, SACNASP (South African Council for Natural Scientific Professions) as earth scientist
- International Mine Water Association (IMWA)

Employment history

2021	Current	Australasian Groundwater and Environmental Consultants Pty Ltd Principal Hydrogeologist
2005	2021	Groundwater Consulting Services (GCS) (Pty) Ltd Director & Principal Hydrogeologist
2001	2005	AngloGold Ashanti Senior Hydrogeologist SA Operations
1996	2001	GHT Consulting Scientists (Pty) Ltd Hydrogeologist

Skills

Pieter is a principal hydrogeologist with over 20 years' experience and based in the AGE Head Office in Brisbane. He holds an MSc, majoring in Hydrogeology and a master's degree in Environmental Management. Pieter gained experience working on projects in Southern Africa, Africa, and South America. His wide-ranging sector experience includes mining hydrogeology, mine closures and liabilities, groundwater resource management, well field design and management, risk-based assessments, and reviews. Pieter is registered as a Professional Natural Scientist with SACNASP in the Earth Science Category. He is also a member of the International Mine Water Association (IMWA), and the International Association of Hydrogeologists (IAH). Pieter has broad project management skills which include activities such as:

- technical input to and management of groundwater assessment activities for mine projects' PFS, FS and DFS studies undertaken across Africa;
- development of detailed local and regional scale conceptualisations to support subsequent numerical flow modelling and other studies;
- assessment of groundwater risk and liability estimation for mine closure projects and development of groundwater management plans;
- groundwater resource exploration and well field design for mining, agricultural and municipal sectors; and
- evaluation and optimisation of water monitoring programs and routine monitoring report compilation.

Areas of expertise and selected project experience

Groundwater Studies for Mine PF, FS and BFS

Block 14 gold project, Sudan. Groundwater supply and well field design for PFS, FS and BFS (Orca Gold, 2016 - 2020).

- Aquifer characterisation and exploration. Planning and oversee airborne geophysical surveys and drilling programs. Oversee and management of pump tests programs. Optimisation of well-field design and well interference through numerical groundwater model applications and scenario modelling. Well design optimisation. Oversee BoQ (bill of quantities) development for well field design.

Doropo gold project, Ivory Coast. Hydrogeology Assessment for Preliminary Economic Assessment (Centamin Pty Ltd 2018 - 2020).

- Optimisation of exploration data and application for baseline hydrogeology for the project. Drilling and testing of test pair boreholes (deep/shallow configuration) to undertake preliminary mine pit inflow and pit wall depressurisation assessment.

Kone gold project, Ivory Coast. Hydrogeology Assessment for PFS (Montage Gold, 2018 - 2021).

- Aquifer characterisation and baseline hydrogeological assessment. Drilling and testing of test boreholes (deep/shallow configuration), preliminary conceptual and numerical groundwater flow model for preliminary mine pit inflow and pit wall depressurisation assessment.

K Hill manganese project, Botswana. Hydrogeological assessment for PFS (Giyani Metals Corporation, 2020).

- Hydrogeological characterisation by using exploration drill data, numerical modelling of abstraction of groundwater to establish zone of influence and impact on farm boreholes.

Kareerand TSF expansion project, South Africa. Hydrogeological assessment for DFS (AngloGold Ashanti, 2017 to 2020).

- Aquifer characterisation through drilling, sampling and testing program. Oversee geochemical sampling, laboratory tests work and modelling for detailed source term assessment. Development of a detailed hydrogeological conceptual model and numerical groundwater model to simulate various TSF construction scenarios.

Rozino gold project, Bulgaria. (Velocity Minerals, 2019).

- Peer review of hydrogeological assessment for PFS.

Kodieran gold mine, Mali. Hydrogeological assessment for optimisation study (Faboula Gold, 2019).

- Mine de-watering assessments and optimisation. Undertake aquifer tests on existing de-watering boreholes to determine specific yield and aquifer parameters. Assess the drainage potential of the upper saprolite and sap-rock interface to evaluate de-watering options. Update hydrogeological conceptual model and develop preliminary numerical flow model. Oversee/ assist with de-watering engineering design.

Ruashi copper mine, DRC. Hydrogeological assessment for FS (Metorex, 2006).

- Point dilution tests on selected borehole to determine aquifer parameters. Hydrogeological conceptual model development for mine inflow assessment.

Groundwater Studies for mine authorisations (GWMP, EIA, EIS)

Narrabri Coal Operations Pty Ltd, NSW, Australia. Addressing NRAR comments and updating Groundwater Management Plan, (Whitehaven, Narrabri Coal Operations Pty Ltd, 2021).

- Addressing NRAR comments and updating groundwater quality and level trigger values, and trigger action response plan.

Amersfoort and Paardekop coal projects, South Africa. Hydrogeological assessments for mining right application process (Xstrata Coal, RSA (Glencore) 2012-2013).

- Oversee drilling and testing program as well as packer-testing on various exploration boreholes to establish first order hydraulic parameters of the different aquifer systems. Apply data and develop a preliminary hydrogeological conceptual and numerical flow and transport model to predict mine de-watering and zone of influence of proposed mine waste infrastructure.

Somkhele anthracite mine, South Africa. Hydrogeological assessments for initial mine licence and various expansion projects (Petmin Group, 2007 to 2021).

- Coal mine hydrogeology assessment, development of a hydrogeological conceptual model, oversee geochemical sampling, laboratory analyses and modelling, pit de-watering and mass transport numerical groundwater modelling. Compile a hydrogeological impact assessment and management report.

Forzando coal mine, South Africa. Hydrogeological assessments for mine expansion licence (Exxaro Coal, 2007 to 2020).

- Hydrogeological Impact Assessment for Forzando North and South for mine expansion. Oversee drilling and testing program, oversee geochemical modelling and development of a hydrogeological conceptual model and numerical groundwater model for impact and risk assessment. Development of a groundwater management plan to mitigate identified risks and impacts.

Akanani Platinum Mine, South Africa. Hydrogeological assessment for mine water use licence application for mine de-watering (Lonmin, 2008).

- Data assessment of geology and hydrogeological information. Assess deep mine water inflow rates through numerical applications.

Mispah TSF expansion project, South Africa. Hydrogeological assessment for EIA (AngloGold Ashanti, 2004 to 2006)

- Aquifer characterisation through drilling, sampling and testing program. Oversee geochemical sampling, laboratory tests work and modelling for detailed source term assessment. Development of a detailed hydrogeological conceptual model and numerical groundwater model to simulate various TSF construction scenarios.

Groundwater assessment for operational groundwater management and mine closure studies

Kareerand TSF groundwater management plan implementation project, South Africa (AngloGold Ashanti, 2013 to 2021).

- Scenario numerical modelling and interception well field design. Oversee unsaturated seepage modelling and geochemical models to confirm source term. Implement a well field to intercept 7000m³/day within a weathered diabase aquifer system. Oversee pilot external and in-situ biological sulphate reduction assessment as part of the water treatment options.

Bisie tin mine follow up hydrogeological assessment for mine inflow evaluation, North Kivu province, DRC (Alphamin Resources Plc, 2020-2021).

- Evaluation and review of available data, site visit and development of a site groundwater monitoring system. Development of preliminary hydrogeological conceptual model and numerical flow model. Concept evaluation of mine de-watering options.

Areas of expertise and selected project experience (continued)

Roy Point coal mine closure, South Africa (South32, 2017 to 2019).

- Mine closure audit for Roy Point mine and groundwater management strategy development. Undertake aquifer characterisation through drilling and testing program, development of hydrogeological conceptual model. Evaluation of tree plantation blocks to determine the feasibility of bio-engineered interception of shallow seepage from UG working and to manage groundwater balance in old OC workings. Oversee groundwater behaviour monitoring of tree block plantations, numerical application and groundwater management plan submission to client and authorities.

BCL, mine closure assessment, Botswana (BCL, 2017 to 2020).

- Hydrogeological impacts assessment, numerical groundwater modelling to delineate the zone of influence and mine closure applications, with special focus on TSF seepage and alluvial aquifer rehabilitation.

Ballengeich coal mine closure, South Africa (Kangra Coal, 2013 to 2018).

- Mine closure and remediation application through geochemical and numerical modelling applications. Identification of acid mine drainage and decant areas at old rehabilitated open cast pits. Development of a rehabilitation program to manage the mine decant and acid mine drainage. Establish of phyto-remediation blocks and evaluation of tree growth and water uptake potential. Oversee and input of design of groundwater interception sump for shallow mine decant interception.

Vaal River and West Wits operations, hydrogeological impact assessment, South Africa (AngloGold Ashanti, 2001 to 2018).

- Hydrogeological impact and groundwater management strategies. Liability and risk audits for Vaal River and West Wits operations. Establish interception well fields at three of the key sulphate drainage areas and undertake annual revision of the interception systems.

Ashanti Pompura TSF contamination assessment for mine closure, Ghana (AngloGold Ashanti, 2005).

- Apply existing hydrogeological conceptual model and data to develop a contaminant transport model to evaluate the extent of contamination plumes along the alluvial aquifer zone.

Mooi nooi chrome mine, hydrogeological assessment for environmental impact statement, RSA (Samancor, 1998 to 2000).

- Undertake various stages of assessment to determine the extent of nitrate contamination in the aquifer systems. Oversee drilling and testing programs. Groundwater monitoring and data assessment and development of a hydrogeological conceptual model and groundwater management plan.

Groundwater Supply

Tasisat gold mine, groundwater supply assessment, well field design, implementation and expansion, Mauritania. (Kinross Gold, 2008 - 2019).

- Oversee airborne geophysics, drilling and testing programs. Aquifer conceptualization and numerical modelling for well field bore interference optimisation. Design and implement a 40 bore well field with capacity to deliver 30 000m³/day. Undertake routine evaluation, optimisation, and monitoring through numerical groundwater model applications.

Tasisat gold mine, Sea water abstraction through beach wells, Mauritania (Kinross Gold, 2011 - 2012).

- Feasibility study for the interception of sea water through subsurface intake wells on the shoreline. Undertake detailed core drilling and test borehole drilling and 30-day pump testing. Data analyses and numerical groundwater model to establish optimal well interference distances for feasibility.

Areas of expertise and selected project experience (continued)

Richardsbay Minerals, Rio Tinto, groundwater supply. RSA (2009, 2010, 2012, 2016).

- Groundwater supply and well field development. Oversee drilling, testing and equipping of wells. Develop an aquifer management plan for the well field and monitor performance.

Department of Public Works KZN, groundwater supply, South Africa (2017 to 2019).

- Groundwater resources feasibility assessments for 800 schools within the KZN Province. Undertake resistivity geophysical surveys at sites to identify most suitable drilling targets for groundwater supply to the schools.

Department of Water and Sanitation, groundwater supply, South Africa (2017).

- Drought relief groundwater resource assessments for 21 communities within the Umkhanyakude District Municipality. Undertake geophysical applications, oversee drilling, testing and equipping contractors. Project management and oversee technical report compilation.

Atacama Minerals, groundwater supply system review, Chile (2011 and 2012).

- Groundwater supply audit, well field and groundwater sustainability evaluation for life of mine study.

Groundwater Assessments for Industrial and Power Supply Sector

FOSKOR fertiliser plant, contaminated groundwater assessment and feasibility assessment, South Africa (2009 -2010).

- Contamination audit, groundwater numerical modelling and management plan review. Evaluate the feasibility of a shallow seepage interception system to intercept and contain sulphate, fluoride, and phosphate seepage.

Reelin bearing works phase 1 and 2 site assessment for ENSR USA, RSA (2007).

- Phase 2 Environmental Site Assessment (ESA) for an industrial site in Durban. Hydrocarbon pollution detection in shallow aquifer system. Oversee drilling, soil sampling and PID testing. Characterise contamination that may be present at the site and determine the potential risks to human health and the environment considering the proposed land use.

Eskom coal fired power stations, review and upgrade of groundwater monitoring systems, South Africa (Hendrina, Tutuka and Majuba PS, RSA, 1996 to 2001).

- Responsible for the quarterly evaluation, updating, maintenance and water monitoring of the power station, including site assessments to determine geological structures and preferred groundwater flow paths through geophysical applications. Oversight of drilling, testing, and routine monitoring. Quarterly and annual technical report compilations with overall groundwater management plans.

Training

- First Aid and CPR (current)
- C Class open licence

Appendix F - Cambium Group CVs

CURRICULUM VITAE



DR EMILIE MASCARENHAS

PRINCIPAL ENVIRONMENTAL SPECIALIST

B.Sc.(Hons I) (University of Sydney)
PhD (University of New England)

CAREER

CAMBIUM GROUP

Principal Environmental Specialist
2014-present

INTEGRATED DESIGN SOLUTIONS

Principal Environmental Specialist
2010-2014

UNIVERSITY OF NEW ENGLAND

PhD Candidate - Ecosystem Management
2004-2010

THE WORLD CONSERVATION

UNION (IUCN)
Biodiversity Officer
2003-2004

ENVIRONMENTAL RESOURCES MANAGEMENT AUSTRALIA (ERM)

Ecologist
2000-2003

ANDREWS NEIL ARCHITECTS AND PLANNERS

Ecologist
1999-2000

SUMMARY

Emilie has over 20 years experience in information management, environmental assessment, data analysis and Geographic Information Systems (GIS) spanning academic, consulting and non government organisations. Her experience includes ecological management and monitoring as well as spatial data management and communication of environmental information to land managers, government agencies and researchers.

Emilie's key skills include:

- Ecological management and monitoring design
- Data analysis + interpretation
- Geographic Informations Systems (GIS)
- Management + communication of environmental data

EXPERIENCE

Emilie joined Cambium Group in November 2010 as Principal Environmental Specialist. Her qualifications in ecological management and monitoring complement her capabilities in Geographical Information System to improve the management and communication of environmental information.

At Cambium Group she specialises environmental management by supporting clients in the collection, management and communication of spatial data using Geographic Information Systems. Emilie combines best-practice, scientifically robust monitoring programs and secure, long-term data management to optimise project outcomes.

Emilie combines best-practice, scientifically robust monitoring programs with secure, long-term data management, which adds value and optimises project outcomes.

Emilie also provides specialist advice on the development and implementation of Cambium Group's online Project Portal, tailoring this service to environmental projects.

The online Project Portal is an information management tool developed to centralise, display and store project data (environmental data and associated reports, spatial data, photos etc) in the long-term. The Portal reduces the risk of data loss on long-term environmental assessments and monitoring programs (e.g. due to staff turnover/change of consultants) and ensures stakeholders always have access to the most up-to-date information in a usable format.

SELECTED PROFESSIONAL EXPERIENCE

Key skills have been applied to the following projects:

Australia ASEAN Power Link (Sun Cable)
Hunter Valley Operations (HVO JV)
Mount Thorley Warkworth (Yancoal)
North West Rail Link (Salini Impregilo)
Peppertree Quarry (Boral)
Marulan South Limestone Mine (Boral)
McArthur River Mine Independent Monitor (ERIAS Group)
Transgrid Southern Poles (WolfPeak)
Mount Pleasant Project (Mach Energy Australia)
Papua LNG (ERIAS Group)
Hail Creek Coal Mine (Rio Tinto)
Valeria Project (Rio Tinto)
Winchester South (Rio Tinto)

SELECTED RECENT PROJECTS

- Biodiversity and Rehabilitation Management Plan updates, Ecological Monitoring and Rapid Visual Assessment, for rehabilitation areas at Peppertree Quarry (Boral, 2018-2021)
- Flora and Fauna Management Plan and Rehabilitation Management Plan updates for Dunmore Sand Extraction Project Modification 2 (Boral, 2021)
- Update to Hunter Valley Operations Offset Management Plan and ecological monitoring for offset areas and River Red Gum populations. (Glencore Australia, 2019 - 2021)
- Management of spatial and non-spatial data for multiple Project Portals - a web based centralised information management system (Yancoal Australia, Glencore Australia, Mach Energy Australia, Boral Resources, ongoing)
- Implementation of field based spatial data collection applications for mobile devices to facilitate and streamline the collection of spatial and other data for land managers (Yancoal Australia, Glencore Australia, Mach Energy Australia, ongoing)
- Spatial data management and presentation, spatial analysis for constraints identification, map preparation for Solar Farm and associated infrastructure, Tennant Creek to Singapore (Sun Cable, March 2020 - present)
- Biodiversity Hotspot analysis - spatial analysis to support Biodiversity Hotspot assessment report. Relevant ecological data were scored and overlaid to identify hotspots on a 1km grid covering the Greater Sydney area. (EES, 2020)
- Threatened species and EEC habitat profile development, habitat mapping and impact calculations for gas field project, QLD. (2Rog, 2021)

PRIOR QUALIFICATIONS AND EXPERIENCE

PHD CANDIDATE,
UNIVERSITY OF NEW ENGLAND (2004-2010)

Thesis Title: Using biofilm assemblages to develop an ecological monitoring framework for regulated coastal rivers in south-eastern NSW.

Emilie's research had a strong focus on scientific method for ecological monitoring to better inform environmental decision-making and to improve reporting on environmental outcomes. With a focused and scientifically robust monitoring design, land managers can not only meet their legislative requirements, but also ensure that the monitoring data is both informative and interpretable.

BIODIVERSITY OFFICER, IUCN (INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE), SRI LANKA (2003-2004)

Emilie's role was to help facilitate learning and communication for effective implementation of the International Convention on Biodiversity throughout south and south-east Asia. This included authoring and reviewing reports.

ECOLOGIST, ENVIRONMENTAL RESOURCES MANAGEMENT (ERM), SYDNEY AND ANDREWS.NEIL, GOSFORD (1999-2003)

Responsibilities included preparing project proposals, designing and undertaking field surveys, reporting, impact assessment under State and Commonwealth legislation and preparing management and monitoring programs.

CURRICULUM VITAE



MARK NOLAN

PRINCIPAL PLANNING APPROVALS AND COMPLIANCE

B.App.Sc. (Environmental Technology)

M. Hort. (Restoration Ecology)

CAREER

CAMBIUM GROUP

Principal - Planning, Approvals and Compliance

2019-present

YANCOAL AUSTRALIA LIMITED

Manager - Project Approvals

2017-2018

RIO TINTO COAL AUSTRALIA

Principal Advisor - Project Approvals NSW

2014-2017

Manager - Project Approvals

2011-2014

Environmental Specialist - Project Approvals

2008-2011

NSW DEPARTMENT OF PRIMARY INDUSTRIES

Stakeholder Liaison

2007-2008

Senior Environmental Officer

1999-2008

Acting Team Leader - Northern

2005-2006

SUMMARY

Mark has over 20 years experience in management of approvals, compliance and land access in the resources sector, including both private and government roles across New South Wales and Commonwealth jurisdictions.

Mark joined Cambium Group in January 2019 as Principal - Planning, Approvals and Compliance. In this role, he manages and advises on approval and compliance projects, assists clients to secure biodiversity conservation agreements for biodiversity offsets, and develops and reviews environmental management plans and compliance documentation.

EXPERIENCE

During Mark's career, he has been responsible for the development and implementation of strategies to secure land use and environmental approvals for complex projects.

He has written and reviewed SSD approval compliance documents, management plans and audits to ensure the outcomes of the approval are well managed and compliant with the approval.

Mark has a strong background in restoration ecology, biodiversity management and mine rehabilitation, development and implementation of database management systems.

Mark is known for his practical experience in all aspects of the environmental field and has a reputation of simplifying complex concepts for clients.

SELECTED PROFESSIONAL EXPERIENCE

YANCOAL AUSTRALIA LIMITED

Manager – Biodiversity and Approvals
June 2018 to January 2019

RESPONSIBILITIES

- Manage and advise on biodiversity matters across Yancoal mining portfolio;
- Secure biodiversity conservation agreements for biodiversity offsets; and
- Provide advice on approvals.

ACHIEVEMENTS

- Managed transition of Warkworth Biodiversity Offsets toward Biodiversity Stewardship agreements.

YANCOAL AUSTRALIA LIMITED

Manager – Project Approvals
September 2017 to June 2018

RESPONSIBILITIES

- Manage transition of approvals for Hunter Valley Operations and Mount Thorley Warkworth Mines; and
- Ensure a smooth transition from the Rio Tinto portfolio to the Yancoal portfolio.

ACHIEVEMENTS

- Successful PAC meeting HVO South Modification 5.

RIO TINTO COAL AUSTRALIA

Principal Advisor – Project Approvals NSW
March 2014 to September 2017

RESPONSIBILITIES

- Manage the NSW Project Approvals team;
- Provide strategic direction on approval matters to Rio Tinto Coal Australia on growth and existing projects; and
- Implement approvals strategies.

ACHIEVEMENTS

- Gained Warkworth Continuation Approval in 2015; and
- Developed management of change and operational readiness to implement the approval.

RIO TINTO COAL AUSTRALIA

Manager – Project Approvals
December 2011 to March 2014

RESPONSIBILITIES

- Manage the NSW Project Approvals team;
- Provide strategic direction on approval matters to Rio Tinto Coal Australia on growth and existing projects; and
- Implement approvals strategies.

ACHIEVEMENTS

- Support external legal team in the Warkworth Extension Land and Environment Court Case 2012;
- Major role in securing emergency approval for the Warkworth Modification 2013 following disapproval of Warkworth Extension 2010;
- Major role in Strategy for the Warkworth Continuation 2014 Environmental Assessment;
- Project managed the Environmental Impact Statement for the Warkworth Continuation to exhibition and response to submissions; and
- Lead role in Government Liaison for the project

RIO TINTO COAL AUSTRALIA

Environmental Specialist –

Project Approvals

November 2008 to December 2011

RESPONSIBILITIES

- Ensure planning approvals for NSW Coal & Allied Operations are maintained;
- Liaise with internal clients/teams to develop new projects or expand current projects with the aim of obtaining appropriate planning approvals;
- Project manage the preparation of Environmental Assessments;
- Ensure project approvals are obtained in a timely manner;
- Ensure the transition of project approval to operational readiness;
- Provide advice on project approvals and compliance; and
- Ensure appropriate legislation is considered in all environmental assessments.

ACHIEVEMENTS

- Major role in project management, development and delivery of the Part 3A Warkworth Extension Environmental Assessment 2010;
- Major role in the securing of State and Commonwealth strategic environmental offsets for the Warkworth Extension Environmental Assessment 2010;
- Major role in the referral of the Warkworth Extension 2010 under the Environmental Protection and Biodiversity Conservation Act (EPBC);
- Led community consultation for the Warkworth Extension including information days and one on one meetings 2009 – 2010;
- Liaised with government on the Warkworth Extension especially on biodiversity issues 2009 – 2010;
- Major role in project management, development and delivery of the Carrington West Wing Environmental Assessment using a Section 5W modification to Hunter Valley North Operations consent 2010;
- Major role in project management, development and delivery of the Mount Pleasant Modification 2010 using section 75W;
- Major role in the securing of Commonwealth strategic environmental offsets for the Mount Pleasant Project 2010 required by the EPBC Act;
- Major role in the referral of the Mount Pleasant Project 2010 under the EPBC Act;
- Major role in project management, development and delivery of the Mount Thorley Dam 9 Expansion using a Section 96 (1a) modification to the Mount Thorley Consent 2009;
- Major role in project management, development and delivery of the Abbey Green Alterations Environmental Assessment using Section 96(2) modification of the Mount Thorley consent 2009; and
- Project managed the Lake James Expansion 2009 modification to the Hunter Valley South Project Approval using section 75W.

Appendix G - Gordon Atkinson & Associates CVs



CAPABILITY STATEMENT

MINE / QUARRY OPERATIONS PLANNING AND REHABILITATION

Prepared by

Gordon Atkinson

Mining Engineer

B.App.Sc. MSc, MAusIMM(CP), FIQ

Contact Details

Telephone 02 67623006

Mobile 0419 438938

gatkass3@bigpond.com

June 2021

PO Box 3687, West Tamworth NSW 2340

ABN 77 070 120 526

Background	<p>Gordon Atkinson & Associates Pty Ltd was formed in 1995 to provide mine engineering and environmental planning services to the mineral resources sector, mines and quarries.</p> <p>The principal Gordon Atkinson is a qualified mining engineer and open cut mine / quarry manager. He has over 40 years of experience in the development, design, management and rehabilitation of industrial mineral sites, extractive industries, coal and iron-ore operations. Limestone mining for lime and cement manufacture is a particular area of expertise both in Australia and the Pacific Region.</p>
Previous Employment	<p>Prior to establishing his consultancy, Gordon was Mine Engineering and Environmental Planning Manager for the former David Mitchell Limited (DML) group of companies based in Tamworth, NSW. Over a ten-year period, he was a Divisional Manager/Mine Manager responsible for safe and efficient management of limestone mining and processing plant operations associated with lime or cement manufacture in Victoria, Papua New Guinea, Queensland, NSW and WA.</p>
Clients	<p>Mine engineering services including resource assessment, feasibility studies, mine design, planning and management have since been provided to a wide range of public, private and government organizations including Boral Cement Limited, Sibelco Australia Limited, Cockburn Cement Limited, Donaldson Coal, Werris Creek Coal Pty Ltd, Castle Mountain Zeolites, Liverpool Plains Shire Council and in 2006 AusAid and the Nauru Rehabilitation Corporation, (NRC). NRC is responsible for land rehabilitation, secondary phosphate mining and the processing of limestone products for the Government of Nauru. Further detail covering mine or quarry operations, planning and rehabilitation is provided on Pages 3 and 4.</p>
Areas of Expertise	<p>Gordon Atkinson & Associates Pty Ltd have expertise in resource development, mine and quarry feasibility, planning, operations, site rehabilitation and closure involving;</p> <ul style="list-style-type: none"> • geological investigations including land access negotiations • conceptual 'life of mine' planning and feasibility studies • mine/quarry operation, design and planning • project management of environmental impact studies, risk assessments and the preparation of environmental management plans • commissioning of environmental monitoring programs • planning and implementation of site rehabilitation • relief mine management / registered mine manager • development and implementation of safety management plans • compliance reporting, environmental audits and expert witness. <p>Gordon Atkinson & Associates Pty Ltd is a licenced user of DS Geovia SURPAC software for geology and mine planning and Global Mapper software for GIS applications.</p>
Education	<p>B. App. Sc. in Mineral Engineering (1977), South Australian Institute of Technology M Sc. in Mineral Production Management (1984), Imperial College, University of London</p> <p>Member of the AusIMM since 1975. Chartered Professional, CP(Mining) 28 January 2015. Fellow of the Institute of Quarrying, 1985 Member of the Environment Institute of Australia & New Zealand, 1996</p>
Certificates	<p>Quarry Managers Certificate of Competency No. 226 for Victoria (1985) Mine Managers Certificate of Competency (Surface) for PNG (1986) Practising Certificate as a Quarry Manager in NSW No. 2018-0128 (5 April 2018) Registered as a Quarry Manager in WA, Sec. 24 Mutual Recognition (WA) Act 2001 (2004) Associate Auditor – Environmental since 1997 certified with Exemplar Global, Cert. No. 14960</p>

	Mine Operations, Planning and Rehabilitation	
1977-1987	Mining Engineer	Cliffs Robe River Iron Associates, WA
1978-1980	Field Engineer	ETSA Leigh Creek, SA
1981 -1984	Between 1981 and 1984 overseas travel through South East Asia, England and Europe was undertaken and included 3 months employment as a contract Site Engineer at the NCB's Erin open cast coal mine near Chesterfield. A 12month MSc in mineral production management at the Royal School of Mines, Imperial College in London was successfully completed during this period	
1985	Quarry Manager	DML Lilydale, Vic. Responsible for the daily administration and control of 20 employees engaged in all aspects of quarry operation including overburden removal, drill & blast, limestone quarrying, crushing and screening. Size and quality were important parameters for limestone feed to 3 x 50tpd "Wests" vertical shaft, gas fired kilns.
1985-1988	Divisional Manager/Mine Manager	DML Bougainville, PNG Under the DML management agreement responsible to the Managing Director of Bougainville Limestone Mining Pty Ltd for general management of a new \$15 million limestone mine and lime manufacturing plant on Bougainville Island in PNG. The operation employed 50 personnel including 9 national and 3 expatriate staff engaged in limestone mining and processing including crushing and screening, quicklime production from a "Wests" 75tpd vertical shaft, oil fired kiln and in the manufacture of 25,000tpa of hydrated lime for supply to Bougainville Copper Limited. Achievements during this period included mine development, cost effective production, training of national employees and development of markets for 20kg bagged hydrate within PNG.
1988-1990	North Queensland Manager	Calcium Products Pty Ltd, Townsville, Qld. Responsible to DML's National Operations Manager for managing all aspects of the subsidiary Company's operations in North Queensland including limestone mining, lime manufacture, administration, marketing and distribution of 35,000tpa of quicklime produced in coal fired, mixed feed kilns located at Woodstock and Ootann. Quicklime markets included the gold mining industry and sugar refineries. Personnel employed totaled 25 including 2 site managers.
1990-1992	Quarry Manager	Australian Cement Limited, Geelong, Vic Registered Quarry Manager for a 1.5Mtpa limestone quarry with contract overburden removal of up to 2Mbcms and employing up to 50 personnel. Project work undertaken included, quarry planning following a 2.6km diversion of the Moorabool River and preparation of a Quarry Landscaping and Rehabilitation Masterplan for Extractive Industry licence renewal.
1992-1995	Mine Engineering and Environmental Planning Manager	DMM, Tamworth, NSW Responsible for ensuring all limestone mines and lime manufacturing plants were developed and operated in accordance with statutory planning approvals, consents, leases and licenses. Operations were located in NSW, QLD and WA at eight locations and employed approximately 100 personnel. Responsibilities included preparation of mining, rehabilitation and environmental management plans in accordance with state legislative requirements. In particular Mining Operations Plan (MOP)s in NSW and Environmental Management Overview Strategies EMOS and Plan of Operations in QLD.
1995 – onwards	Mining Engineer	Gordon Atkinson & Associates Pty Ltd, Mining Operations Plans for Environmental Impact Assessment 1995/1996 Rawlinna Limestone Mine, WA, Notice of Intent - Loongana Lime Pty Ltd 1995/1996 Riverton Limestone Mine, QLD, EMOS & Plan of Ops - Australian Limestone Pty Ltd 1998 Koree Limestone Deposit, NSW, Mining Operations Plan – Messrs. W Saul & P English 2000 EIS & Plan of Operations, Sulcor Limestone Mine, NSW - David Mitchell (NSW) Pty Ltd

	Mining Operations Plans for Environmental Impact Assessment
2001	Mt Winton Andesite Quarry, SOEE - CG Civil & Structural
2001	EIS for Rangers Valley Roadbase Quarry, NSW - Rangers Valley Cattle Station Pty Ltd
2004/2005	Mining & Rehabilitation Program, Antro Feldspar Mine, SA - Unimin Australia Limited
2006	Work Program and Secondary Phosphate Mining Feasibility Study – URS / AusAID
2007	Mine Development/Operations plan, Exmouth, WA – Exmouth Limestone Pty Ltd
2008	2008/2015 Mining Operations Plan – Castle Mountain Enterprises Pty Limited
2009	Variation to the Work Plan, Waurin Ponds Limestone Quarry, Vic – BCSC
2009/2010	2009/2015 Mining Operations Plan for the Marulan South Limestone Mine, BCSC/BCL
2011/2014	Escott Zeolite Mine, Mining Operations Plan – Zeolite Australia Pty Limited
2014/2020	Mine Planner for 30Yr SSD (EIS/DA) Project - Marulan South Limestone Mine, BCL
2015/2016	2015/2022 Mining Operations Plan – Castle Mountain Enterprises Pty Limited
2019/2020	2019/2023 Mining Operations Plan for the Marulan South Limestone Mine, BCL
	Mine Site Rehabilitation
1997/1999	Tallawang Clay Mines, NSW, final rehabilitation plan - NIML
1998	Mt. Fitton Talc Mine, SA, rehabilitation programme - NIML
2001/2005	Wingen Clay Mines, NSW, Triple Chance Feldspar Mines, NSW and Williamstown Clay Mine, SA , final and conceptual rehabilitation plans - Unimin Australia Limited
2007	NRC Rehabilitation & Secondary Phosphate Mining Implementation Project – Nauru
2010/2012	Breadalbane Ironstone Mine, final rehabilitation planning, – Boral Cement Limited
2009/2013, 2016	Review and Project Management Support to the Land Rehabilitation and Secondary Phosphate Mining Project, Republic of Nauru - Nauru Rehabilitation Corporation
	Environmental Management Plans/Systems
2001	EMP for the Sulcor Limestone Mine - David Mitchell (NSW) Pty Ltd
2002/2003	EMS for Donaldson Coal Mine, Maitland NSW - Donaldson Coal Pty Ltd
2004	EMP for the Tanilba Northern Dune Sand Extraction Area - Unimin Australia Limited
2005/2006	EM Plan for Riverton Limestone Mine, QLD - Unimin Lime (NSW) Pty Ltd
2007/2008	Integrated EMS for the Abel U/G Coal Mine - Donaldson Coal Pty Ltd
2016	Conservation Management Plan for Lake Brown, WA Gypsum Exploration Program – CCL
	Environmental Audits and Reporting
1996	Curra & Murgon, QLD, Limestone Mine & Processing Plant Audit - David Mitchell Ltd
1996/1998	Annual Environmental Reports, Loongana & Rawlinna, WA - Loongana Lime Pty Ltd
1998/1999	Environmental Compliance Audit of Australian Mining Leases - NIML
2001/2002	Environmental Review of Sand Mining Operations - Unimin Australia Limited
2002/2005	Annual Environmental Reporting, Roadbase Quarry- Rangers Valley Cattle Station Pty Ltd
2006/2012	Annual Environmental Management Reports, Galong Limestone Mine – Barnu Pty Ltd
2005/2015	Annual Environmental Management Reports, Marulan South Limestone Mine - BCSC/BCL
2016/2020	Annual Environmental Management Report, Castle Mountain Zeolites
	Other Projects
1998	Blast Monitoring - Zeolite Australia Limited
2001	Environmental policy & procedures documentation for EMS - Unimin Australia Limited
2007/2008	Contract Manager Mine Engineering & Environment – Werris Creek Coal Mine
2011/2017	Expert Witness (Quarry Rehabilitation) for NSW Roads and Maritime Services
2012	Investigation of Landslip and Quarry Operation in PNG for Papuan Oil Search Limited
2013	Expert Witness Agripower Barraba Pty Limited v Blomfield [2013] NSWSC 1598

Appendix H – Element and Transport & Urban Planning CVs



Mark Roberts

Senior environmental scientist

Professional profile

Mark has over 10 years' experience in the environment sector and has been involved with the preparation and management of a range of environmental impact assessments under both NSW and Commonwealth legislation; environmental management plans and strategies; constraints analyses; bushfire and hazard assessment; and environmental planning advice.

Mark's experience is across a broad range of industries including mining and extractives; road, water and electricity infrastructure; waste management; coal seam gas; and residential subdivisions.

Mark has managed the complex environmental approvals process and the associated technical studies under Part 4, Part 5 and Part 3A (since repealed) of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act), including recently for the Hume Coal Project, Gloucester Gas Project and Genesis Xero Waste Facility.

Mark is a proven leader of multidisciplinary teams of specialists with strong communication and management skills. Mark specialises in delivering client focused solutions whilst managing social and environmental risk, reputation, regulatory approvals and compliance.

Qualifications

- Bachelor of Environmental Science, University of Western Sydney, 2005
- Graduate Diploma in Environmental Studies, Macquarie University, 2010
- Graduate Diploma in Bushfire Protection, University of Western Sydney, 2014
- Work Cover OHS General Induction (White Card #CGI756200SEQ02)

Career history

February 2021-current

Element Environment Pty Ltd – Principal Environmental Scientist

November 2017-current

Element Environment Pty Ltd – Senior Environmental Scientist

December 2009-October 2017

EMM Consulting Pty Ltd – Senior Environmental Scientist

Relevant project experience

INFRASTRUCTURE

November 2017-current – Element Environment Pty Ltd – Senior Environmental Scientist

Culvert upgrades – Country Rail Network – Lycopodium Infrastructure

Project director for preparation of a review of environmental factors for proposed maintenance and replacement of culverts in the central west of NSW.

Parkes Yard rail corridor – new rail turnouts, Lycopodium Infrastructure –

Preparation of minor works review of environmental factors for proposed construction of four new rail turnouts at the Parkes Yard.

Sustainable diversion limit adjustment mechanism – Murrumbidgee – Preparation of report on potential biodiversity related constraints on development of the Department of Planning, Infrastructure and Environment's proposed sustainable diversion limit adjustment mechanism projects along the Murrumbidgee River.

Snowy 2.0 Project, Narla Environmental – Preparation of biodiversity management plan for the segment factory component of the Snowy 2.0 Project.

Western Sydney Airport, CPB Contractors – Site inspections and preparation of pre-construction land condition assessment report for haul road, contaminated soil stockpile and pad areas.

M4 Smart Motorway Project, Fulton Hogan – Site inspections and preparation of post-construction land condition assessment reports for four construction sites associated with Roads and Maritime Services' M4 Smart Motorway Project.

Transport Access Program, Downer EDI – Carried out the weekly environmental and community site inspections and liaised with site personal regarding environmental matters and improvement.

December 2009-October 2017 – EMM Consulting Pty Ltd – Senior Environmental Scientist

Sydney Water –

- **Sewer and Stormwater Rehabilitation Program (Sewerfix), Sydney NSW**
- **Four Carriers Rehabilitation Project, Sydney NSW**
- **Sydney CBD Stormwater Rehabilitation Program, Sydney NSW**
- **Cooks River Naturalisation Project, Sydney NSW**

Environmental representative for Insituform and Abergeldie Watertech's Sydney Water rehabilitation contracts. Project managed the preparation of review of environmental factors (REF) and construction environmental management plans (CEMP), site inspections and site audits. Provision of ongoing environmental advice.

Environmental representative for Josa Construction's Cooks River Naturalisation Project contracts at Ashfield, Marrickville and Croydon. Project managed the preparation of CEMPs including acid sulphate soil, contamination, surface water, groundwater and tree management plans; site inspections; and site audits. Provision of ongoing environmental advice.

Pitt Town Bypass, RMS – Project managed the preparation and delivery of the preliminary environmental investigation for RMS' proposed Pitt Town Bypass. This involved client and traditional owner liaison, site inspections, supervision and review of ecology and archaeology deliverables, and preparation of the approval documents.

Berrima Rail Project, Hume Coal – Project managed the preparation and delivery of Hume Coal's proposed railway to link the Berrima Branch Line to the proposed Hume Coal Project. This involved site inspections, supervision and review of technical specialist deliverables, and preparation and review of approval documents.

Chain Valley Colliery Rising Sewer Main, LakeCoal – Project managed the preparation of the REF for the sewer main. This involved site inspections, site inspections, supervision and review of technical specialist deliverables,

and preparation and review of approval documents.

Rookwood Road Substation, TransGrid –
Prepared the REF for revisions to Transgrid's proposed substation design, including visual impact assessment.

WASTE MANAGEMENT

November 2017-current – Element Environment Pty Ltd – Senior Environmental Scientist

Teralba Asphalt Plant – Statement of environmental effects for modification to consent for proposed reclaimed asphalt pavement recycling at Teralba Asphalt Plant (Downer EDI Works).

Ulm Avenue Waste Transfer Facility – Review of environmental factors and environment protection license for new construction and demolition waste storage and transfer facility at Sydney Airport (Boral Recycling).

December 2009-October 2017 – EMM Consulting Pty Ltd – Senior Environmental Scientist

- Genesis Zero Waste – construction and demolition waste recycling and landfill facility, modifications, Eastern Creek NSW (Dial-a-Dump)
- Glass, concrete and sand facility at Sandy Point Quarry, Menai NSW (Benedict Industries)
- Green Square Waste building and demolition waste recycling facility EMP, Alexandria NSW (Green Square Waste)
- Waste management plan for a pipe manufacturing and warehousing facility, Penrith NSW (Iplex Pipelines)
- Building and Demolition Waste Recycling Project, research into the viability of green waste recycling and increased building and demolition waste recycling, Blue Mountains NSW (Blue Mountains City Council)

RESOURCES – ENVIRONMENTAL IMPACT STATEMENTS

November 2017-current – Element Environment Pty Ltd – Senior Environmental Scientist

- Appin Mine Ventilation and Access Project, modification report, Menangle NSW (Illawarra Metallurgical Coal Pty Ltd)
- Central Sydney Industrial Estate incorporating Downer Sustainable Road Resources Centre, Rosehill NSW (VE Property and Downer EDI Works Pty Ltd)
- Stockton Sand Quarry, Stockton NSW (Boral Resources (NSW))
- CSR Advanced Manufacturing Hub modifications 3 and 4, Badgerys Creek NSW (CSR Building Products)
- Peppertree Quarry, Southern Highlands NSW (Boral Resources (NSW))
- Marulan Limestone Mine, Southern Highlands NSW (Boral Cement Limited)

December 2009-October 2017 – EMM Consulting Pty Ltd – Senior Environmental Scientist

- Hume Coal Project, Southern Highlands NSW (Hume Coal)
- Currabubula Quarry, Tamworth region NSW (Boral)
- Cobbora Coal Project including rail infrastructure, Cobbora NSW (Cobbora Holding Company)
- Warkworth Mine Extension Project, Hunter Valley NSW (Coal & Allied)
- Chain Valley Bay Mining Extension 1 Project, Chain Valley Bay NSW (Lake Coal)
- Exploration bores in the Hunter Valley, (confidential project)
- Camden Gas Project Modifications, Camden NSW (AGL Energy)
- Berrima Cement Works Modification, Berrima NSW (Boral Cement)
- Gloucester Gas Project Modification 2, Upper Hunter Valley NSW (AGL)
- Kolosori Nickel Deposit, Santa Isabel Island (Solomon Islands) (Axiom Mining)
- Geothermal Test Bore Project, regional NSW (AGL)
- Gloucester Gas Project – Wards River Pilot Testing, coal seam gas test wells, Hunter Valley NSW (AGL)

- Exploration activities in the Hunter Valley (confidential project)
- Hume Coal Project, exploration activities, Southern Highlands (Cockatoo Coal)
- Moolarben Coal Project, exploration activities, Western Coalfields (Moolarben Coal Mines)
- Dunmore Quarry, Modification 8, Illawarra (Boral)
- Wybong Coal Project, integration of Mt Pleasant and Bengalla mining operations, Hunter Valley (Rio Tinto Coal Australia)
- Gloucester Gas Project – Waukivory Pilot Testing, activity variation, Hunter Valley NSW (AGL)

ENVIRONMENTAL MANAGEMENT PLANS

November 2017-current – Element Environment Pty Ltd – Senior Environmental Scientist

Downer Sustainable Road Resources Centre, Rosehill NSW (Downer EDI Works Pty Ltd) – preparation of construction environmental management plan and sub-plans.

Central Sydney Industrial Estate, Rosehill NSW (VE Property Pty Ltd) – preparation of construction environmental management plan and sub-plans.

Badgerys Creek Quarry and Brick Making Project, Badgerys Creek NSW (CSR Building Products Ltd) – preparation of environmental management strategy and sub-plans.

INDEPENDENT ENVIRONMENTAL AUDITS

November 2017-current – Element Environment Pty Ltd – Senior Environmental Scientist

Bringelly Brickworks, PGH Bricks & Pavers – Independent environmental audit and preparation of audit report on compliance of operation of Bringelly Brickworks against the State significant development consent.

Beryl Solar Farm, Downer Ground and First Solar – Independent environmental audit and preparation of audit report on compliance of construction of Beryl Solar Farm against the State significant development consent.

HAZARD ASSESSMENTS

December 2009-October 2017 – EMM Consulting Pty Ltd – Senior Environmental Scientist

- Cobbora Coal Project, bushfire hazard assessment, Cobbora NSW (Cobbora Holding Company)
- Balranald Mineral Sands Project, bushfire hazard assessment, Balranald NSW (Iluka Resources)
- Waste transfer station, bushfire hazard assessment, Smeaton Grange NSW (Benedict Industries)
- Carmona Drive Subdivision, bushfire hazard assessment, Forster NSW (SAF Property)
- Station Street Planning Proposal, bushfire hazard assessment, Menangle NSW (Souwest Developments)
- North Manyana Subdivision, asset protection zones, North Manyana NSW (Kylor)
- Broken Head Quarry Subdivision, bushfire hazard assessment, Broken Head NSW (Crisjoy)
- Hermitage Road Caravan Park, bushfire hazard assessment, Pokolbin NSW (Bartier Perry)
- Cobbora Coal Project, preliminary hazard assessment, Cobbora NSW (Cobbora Holding Company)
- Chain Valley Colliery, bushfire hazard assessment, Mannering Park NSW (LakeCoal)
- Mannering Colliery, bushfire hazard assessment, Mannering Park NSW (LakeCoal)
- Mobile concrete batching plant, bushfire hazard assessment, Bringelly NSW (Boral)
- Hume Coal Project, bushfire hazard assessment, Southern Highlands NSW (Hume Coal)
- Hume Coal Project, hazard and risk assessment, Southern Highlands NSW (Hume Coal)
- Solar electricity projects, bushfire hazard assessments, south-west NSW (Overland Sun Farming)

VISUAL IMPACT ASSESSMENTS

***December 2009-October 2017 – EMM
Consulting Pty Ltd – Senior Environmental
Scientist***

- Gloucester Gas Project Exploration, visual impact report for gas test bores, Upper Hunter Valley NSW (AGL)
- Dunmore Quarry, visual impact assessment for Modification 8, Illawarra (Boral)

OTHER

***December 2009-October 2017 – EMM
Consulting Pty Ltd – Senior Environmental
Scientist***

- Australia and Africa Partnership: Mining Scoping Study, scoping report regarding the potential for Australian assistance to the mining sectors of African countries (AusAID)
- Draft NSW Biodiversity Strategy, submission on behalf of Rio Tinto Coal Australia



CURRICULUM VITAE

TERRENCE KEITH LAWRENCE

QUALIFICATIONS

Master of Urban Planning
Macquarie University

Special Graduate Short Course in
Transport Planning, Management and Control
University of New South Wales

Accelerated Management Development
Program
Australian Graduate School of Management
University of New South Wales

RMS Accreditation as a Lead Auditor for
Road Safety Audits

AFFILIATIONS

Member of Australian Institute of
Traffic Planning and Management

PROFESSIONAL EXPERIENCE

Mr Lawrence has over 40 years experience in traffic engineering and transport planning fields in both the government and private sectors.

This experience includes undertaking and participating in project teams for numerous projects and studies, as a lecturer and specialist trainer in traffic engineering, as well as experience in technical and managerial roles in traffic operations, road safety and traffic management.

Transport & Urban Planning Pty Ltd and associated Companies and Entities

Mr Lawrence has been a director and senior consultant of Transport and Urban Planning Associates Pty Ltd since 1990 and a director and managing partner of Transport and Urban Planning and Transport and Urban Planning Pty Ltd since 1997.

Transport and Urban Planning Pty Ltd undertakes a variety of traffic engineering, road safety and transport planning work for a range of government and private sector clients. Details of works undertaken by Mr Lawrence are summarised below.

Work Undertaken for Transport and Urban Planning and Transport & Urban Planning Associates Pty Ltd

Works undertaken by Mr Lawrence since 1990 include the following:

- Completed some 500 transport, traffic and parking assessment reports for various land use proposals including:
 - Industrial developments;



- Extractive industries;
 - Retail and entertainment developments;
 - Residential developments;
 - Commercial developments; and
 - Mixed use developments
-
- Mr Lawrence has provided evidence in the Land and Environment Court on transport traffic and parking matters, since 1992. On average, Mr Lawrence has been involved in 1-2 matters per year. Mr Lawrence has also given evidence at several Commissions of Inquiry concerning traffic and transport issues associated with extractive industry development proposals.
 - Completed 20 Rail Interchange and or Transport Studies related to vehicle, bicycle, pedestrian and bus access to rail stations for Department of Transport and/or Railcorp.
 - Completed 11 Transport Traffic and Parking Studies for major town centres for various local Councils.
 - Completed 34 Major Traffic Management Studies for various projects, roads and areas for the Roads and Traffic Authority and Local Councils.
 - Participated in numerous Road Safety Audit teams examining the road safety aspects of existing roads and road proposals for the Roads and Traffic Authority, Local Councils, and road design and construction companies.
 - Supervised design work undertaken by Transport and Urban Planning Pty Ltd including:
 - Intersection channelisations, including roundabouts for intersections as well as new access roads and arrangements for proposed developments;
 - Traffic signal design for over 450 intersections.
 - Preparation of Traffic Management Plans and Traffic Control Plans for road works, public utility infrastructure changes, major events and building works.

Roads and Traffic Authority 1973 - 1990

Mr Lawrence held various positions with the RTA and other government departments over an 18 year period. His experience included technical and managerial positions in all aspects of traffic management and planning, road safety and traffic operations, including traffic signal design and operation.