

15 July 2024

Stephen O'Donoghue

Director Resource Assessments
NSW Department of Planning and Environment
GPO Box 39
Sydney NSW 2001

MALABAR RESOURCES

ABN 29 151 691 468
Level 26, 259 George Street
Sydney NSW 2000
PO Box R864
Royal Exchange NSW 1225
Ph: +61 2 8248 1272
Fax: +61 2 8248 1273
Website:
www.malabarresources.com.au

Attention: Mr Stephen O'Donoghue, Director, Resource Assessments

By DPE Portal: Stephen.ODonoghue@planning.nsw.gov.au,

Dear Stephen,

RE: MAXWELL UNDERGROUND COAL MINE PROJECT (SSD 9526) – APPOINTMENT OF SUITABLY QUALIFIED AND EXPERIENCE EXPERTS – WOODLANDS HILL SEAM PANELS 1 TO 4 EXTRACTION PLAN

The Maxwell Underground Mine Project (the Maxwell Project) is an approved underground coal mining operation owned by Maxwell Ventures (Management) Pty Ltd, a wholly owned subsidiary of Malabar Resources Limited (Malabar).

Development Consent SSD 9526 for the Maxwell Project was granted by the NSW Independent Planning Commission on 22 December 2020. Development Consent SSD 9526 has been modified twice (referred to as Mod 1 and Mod 2).

We refer to Condition C8, Part C of Development Consent SSD 9526 granted for the Maxwell Project:

C8. The Applicant must prepare an Extraction Plan for all second workings on the site of the develop to the satisfaction of the Planning Secretary. Each Extraction Plan must:

(a) be prepared by a suitability qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;

Malabar proposes to prepare and submit an Extraction Plan for commencement of secondary extraction within the Woodlands Hill coal seam within the approved Maxwell Underground. This would include the first set of panels in the Woodland Hill Seam (i.e. Panels 1 to 4 of the Woodlands Hill Seam).

The Woodlands Hill Seam Panels 1 to 4 are located adjacent to the Mine Entry Area in the approved Maxwell Underground (Figure 1). Surface features above or in the general vicinity of the Woodlands Hill Panels 1 to 4 include Saddlers Creek, Aboriginal heritage sites and other built features.

The Extraction Plan will be prepared in consideration of the *Extraction Plan Guideline* (DPE, 2022).

In accordance with Condition C8, Part C of Development Consent SSD 9526, Malabar kindly requests the endorsement of the Planning Secretary of the team outlined in this letter, as suitability qualified

and experienced experts for the review/preparation of the Woodland Hill Seam Panels 1 to 4 Extraction Plan (the Extraction Plan).



Figure 1 – Woodlands Hill Panel Layout

Malabar considers the proposed team is suitable for preparation of the Extraction Plan. The Curriculum Vitae of the primary contributing suitability qualified and experienced experts are enclosed (Enclosures 1 to 5), with a summary provided below. Notwithstanding, should the need arise during the preparation of the Extraction Plan, Malabar may request additional suitability qualified and experienced experts be approved by the Secretary.

Team Member	Role
James Barbato (Mine Subsidence Engineering Consultants Pty Ltd)	Preparation and/or review of relevant subsidence components, including predictions of subsidence effects and subsidence impacts, Subsidence Monitoring Program, Built Features Management Plan and Land Management Plan
Greg Roads (WRM Water & Environment Pty Ltd)	Preparation and/or review of surface water components of the Water Management Plan
Noel Merrick (HydroAlgorithmics Pty Ltd)	Preparation and/or review of groundwater components of the Water Management Plan
Dr Colin Driscoll (Hunter ECO Pty Ltd)	Preparation and/or review of relevant flora and fauna components of the Biodiversity Management Plan
Geordie Oakes (AECOM Australia Pty Ltd)	Preparation and/or review of Aboriginal cultural heritage components of the Heritage Management Plan
Josh Peters (Resource Strategies Pty Ltd)	Preparation and/or review of overall Extraction Plan documentation including management plans

The following Malabar personnel would also be involved in the preparation of the Extraction Plan.

Team Member	Role
Donna McLaughlin (Health, Safety, Environment & Community Manager)	Preparation of Built Features Management Plan, Public Safety Management Plan, Coal Resource Recovery Plan and Subsidence Monitoring Program Responsible for review, sign-off and implementation of the Extraction Plan
Dominic Brown (Environment & Community Superintendent)	Preparation of Built Features Management Plan, Public Safety Management Plan, Coal Resource Recovery Plan and Subsidence Monitoring Program Responsible for review and sign-off of the Extraction Plan
James Johnson (General Manager)	Preparation of Built Features Management Plan, Public Safety Management Plan, Coal Resource Recovery Plan and Subsidence Monitoring Program Responsible for review, sign-off and implementation of the Extraction Plan
Shane Pegg (Underground Mine Manager)	Preparation of Built Features Management Plan, Public Safety Management Plan, Coal Resource Recovery Plan and Subsidence Monitoring Program Responsible for review, sign-off and implementation of the Extraction Plan

Tim Britten (Technical Services Superintendent)	Preparation of Built Features Management Plan, Public Safety Management Plan, Coal Resource Recovery Plan and Subsidence Monitoring Program Responsible for review, sign-off and implementation of the Extraction Plan
Peter Sergeant (Registered Mine Surveyor)	Preparation of graphical plans required in accordance with the <i>Extraction Plan Guideline</i> (DPE, 2022).

Dr James Barbato

Dr Barbato has extensive experience in mine subsidence effects, the assessment of mine subsidence impacts on natural and built features and built features and development of strategies to manage the potential impacts from mine subsidence. Dr Barbato has over 8 year' experience as a structural engineer and 18 years' as a specialist in mine subsidence engineering. Dr Barbato's experience in mine subsidence related work has involved preparation of mine subsidence impact management reports for inclusion in a number of Subsidence Management Plans and Extraction Plans. Dr Barbato was part of the team for the Maxwell Project Environmental Impact Statement.

Mr Greg Roads

Mr Roads is a founding director of Water & Environment Pty Ltd and has over 30 years' experience in the water industry including expertise in environmental planning, water allocation, river engineering and the management of riverine corridors and floodplains. Mr Roads has extensive experience in water resource management with over 10 years' development of technical and practical skills in the construction of river engineering works as well as undertaking hydraulic and hydrological modelling studies for rural floodplains. For the past 20 years, Mr Roads has provided expert water resource management advice to clients in local and state governments and the mining, development, insurance and agricultural sectors. Mr Roads was part of the team for the Maxwell Project Environmental Impact Statement.

Dr Noel Merrick

Dr Merrick is a groundwater modeller, hydrogeologist and geophysicist with 50 years' of experience in groundwater science. Dr Merrick has extensive known in groundwater modelling, groundwater geophysics and groundwater policy and management. As a researcher, Dr Merrick pioneered methods of resource sustainability quantification and management, particularly using optimisation techniques. Dr Merrick's experience in groundwater modelling has involved preparation groundwater impact assessment reports for inclusion in a number of Water Management Plans and Extraction Plans. Dr Merrick was part of the team for the Maxwell Project Environmental Impact Statement.

Dr Colin Driscoll

Dr Driscoll is an ecologist with over 40 years' experience, with primary areas of experience in the fields of botany and vegetation, with a good knowledge of birds, mammals, amphibians and reptiles. Dr Driscoll has extensive experience working in consulting, spatial data management, analysis and presentation using various Geographical Information Systems. Dr Driscoll has provided input to numerous mining related projects in the recent years and was part of the team for the Maxwell Project Environmental Impact Statement and the Maxwell Project Mod 1 and Mod 2.

Mr Geordie Oakes

Mr Oakes is a Principal Heritage Specialist with over 15 years' experience as a heritage consultant. Mr Oakes has gained extensive experience in undertaking both Aboriginal and historic heritage assessment working on a wide range of projects in a number of states including New South Wales, Australian Capital Territory, Victoria and the Northern Territory. Mr Oakes has worked on Aboriginal and historic heritage assessments for both the public and private sectors across a range of industries with a focus on mining, linear infrastructure projects, urban development and commercial building development. Mr Oakes was part of the team for the Maxwell Project Environmental Impact Statement and the Maxwell Project Mod 1 and Mod 2.

Mr Josh Peters

Mr Peters is a Principal at Resource Strategies with over 20 years' experience in environmental approvals and management. Mr Peters has extensive experience in environmental impact assessments for the mining sector, including ongoing involvement in environmental assessments at the Maxwell Project. Mr Peters is also registered and certified under the Certified Environmental Practitioner (CEnvP) Scheme as an Impact Assessment Specialists and a Registered Environmental Assessment Practitioner. Mr Peters has been involved in preparation of a number of environmental management plans and Extraction Plans for mine sites across the Southern Coalfields and Hunter Valley and was part of the team for the Maxwell Project Environmental Impact Statement and the Maxwell Project Mod 2.

If you have any queries or would like to arrange a meeting to discuss the findings, please do not hesitate to contact me (dbrown@malabarresources.com.au or [02] 6542 0298).

Yours sincerely,



Dominic Brown
Environment & Community Superintendent

Malabar Resources Limited

- Enclosure 1 Dr James Barbato Curriculum Vitae
- Enclosure 2 Mr Greg Roads Curriculum Vitae
- Enclosure 3 Dr Noel Merrick Curriculum Vitae
- Enclosure 4 Dr Colin Driscoll Curriculum Vitae
- Enclosure 5 Mr Geordie Oakes Curriculum Vitae

Enclosure 1

James Barbato Curriculum Vitae

Dr James Barbato, Associate Director

Company: Mine Subsidence Engineering Consultants Pty Ltd

Profile: James Barbato has had 8 years' experience as a structural engineer and 18 years' experience as a specialist in mine subsidence engineering. His roles include the prediction, assessment and management of mine subsidence due to underground mining. Specialist advice is provided to manage potential impacts to surface infrastructure and natural features and to minimise risk to public safety.

Education: Bachelor of Engineering (Civil, Hons.), 1995
UNSW – School of Civil Engineering
Doctor of Philosophy (PhD), 2017
UNSW – School of Mining Engineering

Affiliations: MIEAust, CPEng, NER

James joined Mine Subsidence Engineering Consultants (MSEC) in July 2004 and has worked on many subsidence studies and reports, some of which are listed below. He has extensive experience in the prediction of mine subsidence effects, the assessment of mine subsidence impacts on natural features and built features and the development of strategies to manage the potential impacts from mine subsidence.

He has been deeply involved in developing the analytical methods to improve the speed and reliability of subsidence predictions. Software has been developed using C#, Java and SQL for the subsidence prediction models, survey database and libraries. The survey database is now one of the largest collections of ground monitoring data for underground longwall mining in Australia.

James has completed post graduate research at the University of New South Wales in 2017. The title of the thesis is *Development of improved methods for the prediction of horizontal movement and strain at the surface due to longwall coal mining*.

He has written or co-written more than 350 subsidence prediction and assessment reports and has been involved in a number of Technical Committees to manage the potential subsidence impacts on natural and built features.

Some recent projects in which James has been involved include the following:

- Appin Longwalls 709 to 711 and 905 – subsidence report to support the Extraction Plan Application, including mining beneath houses, services and steep slopes;
- Chain Valley Miniwalls S2 and S3 – subsidence report to support the Extraction Plan Application for mining beneath Lake Macquarie;
- Integra Underground Longwalls 17 to 20 – subsidence predictions and the Management Plans for mining beneath the Mt. Owen Railway and Bridges;
- Maxwell Project – subsidence report to support the Environmental Impact Statement;
- Springvale Longwalls 428 to 432 – subsidence report to support the Extraction Plan Application; and
- Tahmoor Longwalls 26 to 30 – co-author of the subsidence report to support the SMP Application including mining beneath houses, services and other built infrastructure; and
- Wambo Coal Mine – subsidence reports to support the Modification and Extraction Plan Applications for the North Wambo Underground Mine, South Bates Underground Mine and South Bates Extension Underground Mine.

James is a current member of the Mine Subsidence Technological Society (MSTS) and has been involved in the preparation of the previous four conferences (2007, 2011, 2014, 2017 and 2022), which included the review of technical papers, compilation of the conference proceedings and organisation of the presentations.

He has also assisted in two ACARP Research projects and have presented or co-authored a number of technical papers including:

1. Waddington, A.A. and Barbato, J.P. *The Undermining of Railways*. Mine Subsidence Technological Society, Sixth Triennial Conference – Subsidence Management Issues. Maitland, October-November 2004, pp. 173-182.
2. Barbato, J.P., Kay, D.J., Pinkster, H. & de Somer, B. *Monitoring of subsidence movements at major infrastructure*. Seventh AusIMM Australasian Institute of Mining and Metallurgy Underground Coal Operators Conference on Sustainable Coal Mine Development. University of Wollongong, 2006, pp. 305-312.
3. Kay, D.J., Barbato, J.P., Brassington, G. & de Somer, B. *Impacts of Longwall Mining to Rivers and Cliffs in the Southern Coalfield*. Seventh AusIMM Australasian Institute of Mining and Metallurgy Underground Coal Operators Conference on Sustainable Coal Mine Development. University of Wollongong, 2006, pp. 327-336.
4. Kay, D.R., Barbato, J.P. & Mills, K.W. *Review of Mechanisms resulting in Observed Upsidence and Closure Movements*. Mine Subsidence Technological Society, Seventh Triennial Conference, University of Wollongong, Nov. 2007, pp. 197-205.
5. Barbato, J.P. & Sisson, S.A. *Analysis of Mining Induced Strains*. Mine Subsidence Technological Society, Eighth Triennial Conference, Management of Subsidence: State of the Art, Pokolbin, 15 to 17 May 2011, pp. 15-24.
6. Barbato, J.P. & Garlinge, S. *Continuous Monitoring of Longwall Undermining – Blakefield South LW1*. Mine Subsidence Technological Society, Eighth Triennial Conference, Management of Subsidence: State of the Art, Pokolbin, 15 to 17 May 2011, pp. 131-136.
7. Waddington, A.A., Barbato, J.P., Bullock, D.W. & Kay, D.J. *The Assessment of Subsidence Impacts on Building Structures*. Mine Subsidence Technological Society, Eighth Triennial Conference, Management of Subsidence: State of the Art, Pokolbin, 15 to 17 May 2011, pp. 155-166.
8. Barbato, J.P., Brassington, G. and Walsh, R. *Valley Closure Impact Model for Rockbar Controlled Streams in the Southern Coalfield*. Mine Subsidence Technological Society, Ninth Triennial Conference, Mine Subsidence: Risk Management in Action, Pokolbin, NSW, 11 to 13 May 2014.
9. Barbato, J., B. Hebblewhite, R. Mitra, and K. Mills (2016). *Review of horizontal surface movements due to longwall coal mining using numerical modelling*. In: Proceedings of the Coal Operators Conference. University of Wollongong, 10-12 February 2016, pp. 213-223.
10. Barbato, J., B. Hebblewhite, R. Mitra, and K. Mills (2016). *Prediction of horizontal movement and strain at the surface due to longwall coal mining*. In: International Journal of Rock Mechanics and Mining Sciences, Volume 84, April 2016, pp. 105-118. <https://doi.org/10.1016/j.ijrmms.2016.02.006>.
11. Barbato, J., B. Hebblewhite, R. Mitra, K. Mills, and A. Waddington (2017). *Development of predictive methods for strain at the surface due to longwall coal mining*. In: Mining Technology, October 2017. <http://dx.doi.org/10.1080/14749009.2017.1386815>.
12. Barbato, J., et al. (2017). *Development of Predictive Methods for Horizontal Movement and Strain at the Surface due to Longwall Mining*. Proceedings of the tenth triennial Mine Subsidence Technological Society Conference, Pokolbin, Hunter Valley, NSW, 5-7 November 2017. pp. 207-222.

Enclosure 2

Greg Roads Curriculum Vitae

GREG ROADS

groads@wormwater.com.au

DIRECTOR / SENIOR PRINCIPAL ENGINEER



Greg is a founding director of WRM and has over 30 years experience in the water industry. He offers clients expertise in environmental planning, water allocation, river engineering and the management of riverine corridors and floodplains.

Greg spent the first decade of his career in largely 'hands-on' roles developing his technical and practical skills in the construction of river engineering works as well as undertaking hydraulic and hydrological modelling studies for rural floodplains. For the past 20 years, he has provided expert water resource management advice to clients in local and state governments and the mining, development, insurance and agricultural sectors. He has worked on major dam and flood studies across Australia and appeared as an expert witness in numerous court cases and before government inquiries.

Greg combines technical expertise with strong stakeholder liaison and communication skills. He was highly commended by his then employer for his work with the community on the Tumut and Upper Murray River Works Program. He has also lectured in water resource management, extreme flood estimation, hydraulic modelling and river engineering at the Queensland University of Technology.

PROFESSIONAL EXPERIENCE

2004 to present
Director
WRM Water & Environment Pty Ltd

1997 to 2004
Senior Engineer
Water Studies

1993 to 1997
River Engineer / Floodplain Engineer
NSW Dept of Land and Water Conservation

1988 to 1993
Cadet Engineer
NSW Dept of Land and Water Conservation

AREAS OF EXPERTISE

Expert evidence
Hydrological modelling
2D and 1D hydraulic modelling
Extreme flood estimation
Floodplain management
River engineering and fluvial geomorphology
Water allocation and resource planning
Mine site water management
Water balance and yield studies
Water quality management

QUALIFICATIONS

Bachelor of Engineering (Civil) (First Class Honours), University of Technology, Sydney, 1993

Member, Engineers Australia

Registered Professional Engineer,
Queensland, Australia

Member Australian Water Association

Member Stormwater Industry Association.

CAREER HIGHLIGHTS

Boggabri Flood Study, NSW

Pioneer River Floodplain Risk Management Study, Qld

Narrabri Flood Study, NSW

Moree and Environs Floodplain Management Study, NSW

Nyngan Floodplain Risk Management Study, NSW

Pioneer River Flood Study, Qld

Namoi River Flood Study and Flood Impact Assessment, NSW

Expert Advice to the Commission of Inquiry into the Operation of Wivenhoe Dam, Qld

Mackay Ring Road Planning Study, Qld

McCreadys Creek Stormwater Trunk Infrastructure Study, Qld

Bakers One Catchment Stormwater Trunk Infrastructure Study, Qld

Experience

Expert witness / expert review

MILES V CAIRNS REGIONAL COUNCIL QUEENSLAND (2020)

Provision of expert advice to Council on their decision to refuse a Change Application in respect of a Development Permit for a Material Change of Use (MCU) for Rooming Accommodation for an application that contravened the Flood overlay code. **MacDonnells**

REVIEW OF POTENTIAL FLOOD IMPACTS CAUSED BY THE AIRPORTLINKM7 AT CLAYFIELD QUEENSLAND (2020)

Reviewed the flood investigations undertaken by the Airport Link JV for the Airportlink tunnel to address a complaint made by a resident in the Clayfield area. **Ashurst**

PEMBROKE OLIVE DOWNS V SUNLAND CATTLE & ORS QUEENSLAND (2020)

Prepared and presented evidence to the Qld Land Court in relation to the objections lodged in opposition to the Pembroke Olive Downs Coking Coal Project. **Allens**

THE GULLY PARTNERSHIP V WATER NSW NEW SOUTH WALES (2019)

Prepared expert advice regarding the operation of the Gwydir River weirs and regulators during the August and September 2016 flood event. **Slater & Gordon**

DICKSON PROPERTIES PTY LTD V BCC & ORS QUEENSLAND (2019)

Prepared expert evidence to the Queensland Planning and Environment Court on a development application dispute involving Brisbane River flooding in Moggill. **King & Company Solicitors**

LENNIUM GROUP VS BCC & ORS QUEENSLAND (2018)

Prepared and presented evidence to the Qld Planning and Environment Court in relation to a proposed urban development in Yeronga in Queensland. **Lennium Group Pty Ltd**

NEW ACLAND COAL LTD VS FRANK ASHMAN & ORS QUEENSLAND (2016-17) & 2021

Prepared and presented evidence to the Qld Land Court in relation to the objections lodged in opposition to the New Acland Coal Mine Stage 3 Expansion project near Oakey in Queensland. **Clayton Utz**

AUSTCORP'S CORAL COVE RESIDENTIAL DEVELOPMENT MINISTERIAL CALL IN QUEENSLAND (2014)

Prepared an independent review of the stormwater impacts of Austcorps proposed master planned, residential community at Coral Cove, Bundaberg to assist the Deputy Premier in deciding the application. **Qld Department of State Development, Infrastructure and Planning**

HOLCIM'S INNES PARK SOUTH QUARRY PROJECT MINISTERIAL CALL IN QUEENSLAND (2014)

Prepared an independent review of the stormwater impacts of Holcim's proposed Innes Park South Quarry near Bundaberg to assist the Deputy Premier in deciding the application. **Qld Department of State Development, Infrastructure and Planning**

ENDOCOAL LTD VS GLENCORE COAL PTY LTD QUEENSLAND (2014)

Prepared and presented evidence to the Qld Land Court on a dispute over potential water quality impacts of a mining lease and environmental authority granted for the Meteor Downs South Project near Rolleston. Assisted in the preparation and negotiations of a make good agreement with the objector. **Clayton Utz**

COMMISSION OF INQUIRY INTO THE OPERATION OF WIVENHOE DAM, QUEENSLAND (2011 AND 2012)

Prepared an independent review and provided expert evidence at the Commission of Inquiry into the operation of Wivenhoe Dam during the January 2011 flood of Brisbane and Ipswich. **Seqwater and the Commission of Inquiry**

BOTTLEBRUSH CRESCENT DEVELOPMENT SUFFOLK PARK V BYRON SHIRE COUNCIL NEW SOUTH WALES (2010)

Prepared expert evidence including a flood study and stormwater management report to determine the impact on flood levels of the proposed development in Suffolk Park. **Tain Investments**

SALT PAN CREEK EROSION AND FLOODING ADVICE QUEENSLAND (2005)

Provided advice at a pre-court meeting on the appropriate set-back distance and erosion protection measures for a proposed development on Salt Pan Creek in Oxenford following council's objection to a development application. **Gold Coast City Council / King and Company Solicitors.**

CHELMER BOWLS CLUB RE-DEVELOPMENT STORMWATER MANAGEMENT QUEENSLAND (2005)

Prepared a flood study report to determine the impact on flood levels of filling associated with the proposed Chelmer Bowls Club. The findings of the report were presented at the Queensland Planning and Environment Court. **Deacons Lawyers**

JANUARY 1998 FLOODING AT LOT 3 KATHERINE TERRACE, KATHERINE, NORTHERN TERRITORY (2003)

A commercial property owner was appealing against a decision by CGU Insurance to reject their claim for damage following the 1998 Katherine River flood. Developed a site-specific flood assessment together with a detailed hydraulic model of the area to determine whether the property was inundated by stormwater prior to Katherine River flood water. The findings were presented at the Northern Territory Supreme Court. **Hunt & Hunt Lawyers / CGU Insurance**

SANDY CREEK FLOOD STUDY AT 280 INDOOROOPIILY ROAD, INDOOROOPIILY QUEENSLAND (2002)

Prepared a flood study of Sandy Creek at Indooroopilly Road to assess the impact of the proposed development at 280 Indooroopilly Road on creek flood levels. The findings of the study were presented in the Queensland Planning and Environment Court. **Taiwan Investment Management**

AUGUST 1998 FLOODING AT THREE PROPERTIES IN WOLLONGONG, NEW SOUTH WALES (2001)

Completed project on behalf of two residential owners and one commercial property owner who were appealing against a decision by QBE Insurance to reject their claim for damage following the 1998 Wollongong storm event. Developed site-specific flood assessments to determine whether their properties were inundated by stormwater prior to flooding from a local creek. The matter was resolved out of court. **Curwood and Partners**

JANUARY 1998 FLOODING AT 16 TINDAL ST, KATHERINE, NORTHERN TERRITORY (2001)

The owner of 16 Tindal St was appealing against a decision by CGU Insurance to reject their claim for damage following the 1998 Katherine River flood. Developed a site-specific flood assessment and a detailed hydraulic model to determine whether the property was inundated by stormwater prior to Katherine River flood water. The findings were presented at the Ballarat Magistrates Court. **Tress Cocks Maddox Lawyers**

JANUARY 1998 FLOODING AT KATHERINE TERRACE, KATHERINE, NORTHERN TERRITORY (2001)

A commercial property owner was appealing against a decision by HIH Insurance to reject their claim for damage following the 1998 Katherine River flood. Developed a site-specific flood assessment and a detailed hydraulic model to determine whether the property was inundated by stormwater prior to Katherine River floodwater. The findings were presented in the Northern Territory Supreme Court. **Lawson Downs Lawyers**

ANCHORAGE FARMS LICENCE APPLICATION APPEAL, ST GEORGE, QUEENSLAND (2001)

Anchorage Farms was appealing against a decision by the Queensland Department of Natural Resources and Mines to reject an application to amalgamate two waterworks licences on the Lower Balonne River. Developed on-farm water balance models of existing and

amalgamated licence conditions to assess the impact of abstractions on downstream flows, which were presented in the Queensland Planning and Environment Court. **Fox and Thomas**

CORISH FARMS LICENCE APPLICATION APPEAL, TALWOOD QUEENSLAND (2001)

The Queensland Department of Natural Resources and Mines imposed significant pumping restrictions on Corish Farms for moving its water-harvesting pump site on the lower Weir River further upstream. Developed an IQQM water balance model of the Lower Weir River to assess the impact on other water harvesters of moving the water-harvesting pump site. The model was used to assist Corish Farm's appeal against the restrictions. The matter was settled out of court. **Fox and Thomas**

NELSONS CREEK WATER LICENCE APPLICATION APPEAL NEW SOUTH WALES (2000)

Objections were received to the licensing of a pump on Nelsons Creek for Timbarra Mine. A daily rainfall runoff Sacramento model and a daily behavioural model (IQQM) were developed and calibrated for Nelsons Creek at the pump site to assess the impacts of the pumping regime on downstream flows. The findings of the study were defended in a Land and Environment Court hearing on the matter. **Phillips Fox Lawyers**

FLOODING IMPACTS OF A LEVEE ON THE LACHLAN RIVER, FORBES NEW SOUTH WALES (1997–1998)

Several objections were received following the licence application of a levee across the Buyuma Runner near the Lachlan River upstream of Forbes. Developed a hydraulic model of the Lachlan River and adjacent flood runners to assess the impact of the levee on upstream flood levels. The findings were presented in a Land Board Hearing in Forbes and a subsequent appeal in the Land and Environment Court.

Department of Land and Water Conservation, NSW

Minesite water management studies

LAND EVOLUTION MODELLING FOR THE VULCAN MINE FINAL LANDFORM, QUEENSLAND (2023)

Developed a SIBERIA geomorphological and landscape evolution model within the CAESAR-lisflood platform of the proposed final landform of the Vulcan Coal Mine waste rock emplacement areas for a Progressive Rehabilitation and Closure Plan. **Vitrinite**

EAGLE DOWNS MINE PRCP AND SURFACE WATER ASSESSMENT, QUEENSLAND (2022)

Prepared a surface water technical report for the proposed Eagle Downs Mine including development of release strategies in accordance with the EA and an assessment of mine subsidence on the final landform. **South 32**

BHP MINES RAIN-ON-GRID DRAINAGE STUDIES, QUEENSLAND (2020)

Developed rain-on-grid hydraulic models of Daunia, Poitrel and South Walker Mines to assess local stormwater flood risk and pit inundation. **BHP Metcoal Holdings**

MIDDLEMOUNT MINE SOUTHERN EXTENSION SURFACE WATER ASSESSMENT, QUEENSLAND (2020)

Prepared a surface water technical report to support a consent modification for Middlemount Mine. The modification required a stream diversion and a significant change to the final landform. **Middlemount Coal**

NARRABRI MINE SOUTHERN EXTENSION SURFACE WATER ASSESSMENT, NEW SOUTH WALES (2020)

Developed a Goldsim water and salt balance of the Narrabri Mine water management system, including dirty, saline and mine affected water management dams, and micro-filtration and reverse osmosis water treatment plants. The impact of the proposed modification on the approved mine subsidence and existing surface drainage features was also investigated. The Narrabri Mine Water Management Plan was updated to incorporate the proposed changes. **Whitehaven Coal Pty Ltd**

GOONYELLA RIVERSIDE MINE FLOOD STUDY, QUEENSLAND (2019)

Developed rain-on-grid hydraulic models of the mine to assess local stormwater flood risk and pit inundation. Developed hydrological and hydraulic models of the Isaac River to assess flood risk. **BHP Metcoal Holdings**

PEAK DOWNS MINE FLOOD STUDY, QUEENSLAND (2020)

Developed rain-on-grid hydraulic models of the mine to assess local stormwater flood risk and pit inundation. Developed hydrological and hydraulic models of Downs Creek, Stevens Creek, Scott Creek and Roper Creek to assess flood risk. **BHP Metcoal Holdings**

BMA EROSION AND SEDIMENT CONTROL AND MINE AFFECTED WATER STANDARD, QUEENSLAND (2019)

Worked with BMA staff to facilitate the development of a standard to implement Best Practice Erosion and Sediment Control and Mine affected water management across the Queensland BMA sites. **BHP Mitsubishi Alliance**

MAXWELL PROJECT EIS - SURFACE WATER ASSESSMENT, NEW SOUTH WALES (2019)

Prepared a surface water technical report EIS to support an application for an underground coal mine in the Upper Hunter. A water management strategy was developed for the operational phase and assessed using OPSIM water balance model. Final void assessments were undertaken for the old Drayton Mine pits, which forms part of the project. **Malabar Coal Limited**

NARRABRI MINE BRINE MANAGEMENT PLAN, NEW SOUTH WALES (2019)

Developed and assessed a range of proposed strategies to manage the long term production of brine at the Narrabri Mine micro-filtration and reverse osmosis water treatment plants. **Whitehaven Coal Pty Ltd**

OLIVE DOWNS PROJECT EIS - SURFACE WATER ASSESSMENT, QUEENSLAND (2018)

Assisted in the preparation of a surface water technical report EIS to support an application for a major open cut coal mine in the Bowen Basin. A water management strategy was developed for the operational phase and assessed using OPSIM water balance model. **Pembroke Resources**

MIDDLEMOUNT MINE WESTERN EXTENSION SURFACE WATER ASSESSMENT, QUEENSLAND (2018)

Prepared a surface water technical report to support a consent modification for Middlemount Mine. The modification required a stream diversion and a significant change to the final landform. **Middlemount Coal**

DUE DILIGENCE ASSESSMENT KESTREL AND HAIL CREEK MINE QUEENSLAND (2018)

Prepared an independent audit of the Kestrel and Hail Creek mine water management issues as part of a due diligence assessment. **South32**

WILKIE CREEK COAL MINE — FINAL VOID WATER BALANCE MODEL, QUEENSLAND (2018)

Developed a GOLDSIM final void water balance model final void model with the aim of providing site with forecast water balance and assist in managing operational risk associated with water management. **Peabody Australia**

CAMBEY DOWNS MINE — SURFACE WATER ASSESSMENT, SURAT BASIN QUEENSLAND (2017-18)

Undertook a surface water impact assessment for an extension to an existing open-cut coal mine located near the Condamine River in the Surat Basin, Qld. Study included conceptual design and water balance modelling, including the sizing of mine storages and development of water management procedures. **Yancoal**

MIDDLEMOUNT MINE NORTH EAST EXTENSION SURFACE WATER ASSESSMENT, QUEENSLAND (2016)

Prepared a surface water technical report to support a consent modification for Middlemount Mine. The modification required a modification of the final landform and additional water management structures. The Water Management Plan was updated to incorporate the modification. **Middlemount Coal**

NEW ACLAND COAL WATER MANAGEMENT PLAN REVIEW QUEENSLAND (2016)

Provided an independent review of the proposed surface water impact assessment for the Stage 3 expansion of New Acland Coal. **New Hope Group**

NARRABRI MINE MODIFICATION 5 SURFACE WATER ASSESSMENT, NEW SOUTH WALES (2015)

Developed a Goldsim water and salt balance of the Narrabri Mine water management system, including dirty, saline and mine affected water management dams, and micro-filtration and reverse osmosis water treatment plants. The impact of the proposed modification on the approved mine subsidence and existing surface drainage features was also investigated. The Narrabri Mine Water Management Plan was updated to incorporate the proposed changes. **Whitehaven Coal Pty Ltd**

BALRANALD MINERAL SANDS PROJECT SURFACE WATER MANAGEMENT REPORT NEW SOUTH WALES (2015)

Prepared a surface water management report for a proposed mineral sands mining operation in south-western NSW. The surface water management report included details of proposed surface water management infrastructure, detailed daily water balance modelling of the proposed water management system, a flood study of the project area and an assessment of potential impacts to surface water due to the project. **Iluka Resources**

ULAN MINE WATER MANAGEMENT PLAN AUDIT, NEW SOUTH WALES, (2013 AND 2016)

Investigated the surface water aspects of the Ulan Coal Mine for an independent environmental compliance audit for the Department of Planning and Environment. **Hansen Bailey**

ISAAC PLAINS MINE WATER MANAGEMENT PLAN, QUEENSLAND (2015)

Prepared a Water Management Plan for the care and maintenance phase of the mine. **Middlemount Coal**

BENGALLA COAL MINE MODIFICATION, SURFACE WATER ASSESSMENT AND WATER MANAGEMENT PLAN NEW SOUTH WALES, (2015)

Prepared a surface water technical report to support a consent modification for Bengalla Mine. The modification required diversion of a floodplain watercourse and construction of new sediment control dams. **Hansen Bailey**

MIDDLEMOUNT MINE RESIDUAL VOID HYDROLOGY STUDY, QUEENSLAND (2015)

Prepared a surface water assessment of the final landform of the mine including a water balance of the final void and an assessment of long term mine drainage. **Middlemount Coal**

WHITE DAM GOLD MINE MINE CLOSURE WATER MANAGEMENT PLAN, SOUTH AUSTRALIA (2014)

Prepared a water management strategy for the closure of the White Dam Gold Mine. Developed a water balance model of the final void and prepared a drainage strategy for the final landform. **Exco Resources**

METEOR DOWNS SURFACE WATER IMPACT ASSESSMENT, QUEENSLAND (2012–13)

Prepared a surface water impact assessment for a proposed open-cut coal mine located within the floodplain of Spring Creek, north of Rolleston. Study included detailed hydrologic and hydraulic modelling, and water balance modelling, including the sizing of mine storages and development of water management procedures (e.g. controlled releases of water in accordance with Fitzroy Basin Model Water Conditions). **McCollum Environmental Management Pty Ltd**

PEABODY ENERGY AUSTRALIA — EROSION AND SEDIMENT CONTROL STANDARD QUEENSLAND (2013)

Developed an Erosion and Sediment Control (ESC) Standard for all Peabody mines in Queensland, incorporating the preparation of ESC implementation plans for a number of sites. **Peabody Energy Australia**

MORANBAH SOUTH PROJECT SURFACE WATER ASSESSMENT, QUEENSLAND (2013)

Development of a water balance model and assessment of surface water impacts as part of an EIS for the proposed Moranbah South Project. **Anglo American Metallurgical Coal Pty Ltd**

ISAAC PLAINS SOUTH – SURFACE WATER INFRASTRUCTURE CONCEPT DESIGN AND ASSESSMENT, QUEENSLAND (2013)

Development of concept design of flood protection levees, a stream diversion and mine water management infrastructure. **TMM Group**

MINYANGO PROJECT SURFACE WATER ASSESSMENT, QUEENSLAND (2013)

Development of a water balance model and assessment of surface water impacts as part of an EIS for the proposed Minyango Project. **Blackwater Coal Pty Ltd**

DRAYTON SOUTH PROJECT SURFACE WATER ASSESSMENT, NEW SOUTH WALES (2012 - 2014 - 2015)

Development of a water balance model and assessment of surface water impacts as part of an EIS for the proposed Drayton South Project. The mine plan was altered three times following feedback from the community and the Planning Assessment Commission. A draft Water Management Plan was developed for the project. **Anglo American Metallurgical Coal Pty Ltd**

COALPAC PROJECT SURFACE WATER ASSESSMENT, NEW SOUTH WALES (2012)

Development of a water balance model and assessment of surface water impacts as part of an EIS for the Cullen Valley and Invincible Colliery Expansion Project. **Coalpac**

MIDDLEMOUNT COAL WATER MANAGEMENT PLAN AND CONSEQUENCE ASSESSMENT, QUEENSLAND (2012)

Prepared a Water Management Plan including a consequence assessment of the mine water management storages. **Middlemount Coal**

MIDDLEMOUNT COAL EROSION AND SEDIMENT CONTROL PLAN, QUEENSLAND (2012)

Prepared an Erosion and Sediment Control plan to manage non mine affected surface water on the site. **Middlemount Coal**

DRAYTON MINE MODIFICATION SURFACE WATER ASSESSMENT, NEW SOUTH WALES (2011)

Prepared a surface water technical report to support a consent modification. A water balance model was used to assess the performance of the modified water management system. **Anglo American Metallurgical Coal Pty Ltd**

ISAAC PLAINS MINE WATER MANAGEMENT PLAN REVIEW, QUEENSLAND (2010 AND 2011)

Review of the water management system at the Isaac Plains Coal Mine and provide advice on measures required to meet their water quality release criteria. **Isaac Plains Coal**

NORTH GOONYELLA MINE WATER MANAGEMENT REVIEW, QUEENSLAND (2010 - 2014)

Review of the water management system at the North Goonyella Minesite and provide advice on measures required to meet their water quality release criteria. **Peabody Energy Australia**

MIDDLEMOUNT COAL MINE STAGE 2 SURFACE WATER ASSESSMENT, QUEENSLAND (2011)

Assessment of surface water impacts of the Stage 2 Middlemount Coal Mine. Flood and stream diversion studies of Roper Creek and a minesite water management plan was prepared. **Middlemount Coal**

WARKWORTH EXPANSION ENVIRONMENTAL ASSESSMENT, NEW SOUTH WALES (2010)

Prepared a surface water assessment report for the proposed expansion of the Warkworth open-cut pit. Included a flood study of Wollombi Brook and liaison with other project consultants to assess water balance impacts of the proposal. **Mitchell McLennan**

EAGLE DOWNS MINE SITE WATER BALANCE, QUEENSLAND (2010)

Development of a daily minesite water balance model of the proposed Eagle Downs Underground mine to size a dirty water storage.

Bowen Basin Joint Venture

CARRINGTON PIT EXTENSION SURFACE WATER ASSESSMENT, NEW SOUTH WALES (2010)

Assessment of surface water impacts for the Carrington West Wing Extension at HVO North as part of an Environmental Assessment. Flood and geomorphic studies of the Hunter River were undertaken and a water management plan prepared. **Coal & Allied Operation Pty Ltd**

COPPABELLA MINE WATER MANAGEMENT PLAN, QUEENSLAND (2009)

Development of a surface water management plan for the Coppabella Coal Mine. Modifications were made to the minesite water management plan to satisfy the Fitzroy Basin Water Conditions for Coal Mines. A mine site water balance model was developed to design the various water management storages and release rules to meet the new requirements. **Isaac Plains Coal**

ISAAC PLAINS MINE WATER MANAGEMENT PLAN, QUEENSLAND (2009 & 2013)

Development of a surface water management plan for the Isaac Plains Coal Mine. Modifications were made to the minesite water management plan to satisfy the Fitzroy Basin Water Conditions for Coal Mines. A mine site water balance model was developed to design the various water management storages and release rules to meet the new requirements. **Isaac Plains Coal**

NARRABRI COAL MINE STAGE 2 EA, SURFACE WATER MANAGEMENT STUDIES, NEW SOUTH WALES (2009)

Undertaking the surface water component of an Environmental Assessment for the stage 2 longwall project near Narrabri. Mitigation strategies were developed to manage the significant volumes of highly saline water that was expected from underground and to manage the impact of mine subsidence on the local water ways. **Narrabri Coal Operations Pty Ltd**

INTEGRA COAL BARRETT AND HEBDEN SEAM MINE SUBSIDENCE STUDY, NEW SOUTH WALES (2008)

Estimation of the impact of mine subsidence from the Barrett and Hebden Seam on flood behaviour and creek erosion along Bettys Creek, Main Creek and Glennies Creek. **Integra Coal Pty Ltd**

MIDDLEMOUNT COAL EMPLAN, SURFACE WATER MANAGEMENT STUDY, QUEENSLAND (2008)

Development of a minesite water management plan and water balance model of the proposed new coal mine near Middlemount. Controlled release rules were developed from the water management storages to meet Roper Creek water quality thresholds. A flood study was undertaken to determine the impact of flood protection levees on creek flood levels and flood velocities. **Middlemount Coal**

ISAAC PLAINS MINE EIS, SURFACE WATER MANAGEMENT STUDIES, QUEENSLAND (2008)

Undertaking the surface water component of an Environmental Impact Study for the proposed new above ground coal mine near Moranbah. A mine site water balance model was developed to design the various water management storages and release rules to meet EPA requirements. Development of a concept design of a stream diversion around the proposed mine. **Isaac Plains Coal**

LAKE LINDSAY MINE FLOOD AND STORMWATER MANAGEMENT STUDY, QUEENSLAND (2007)

Estimation of flood levels along German Creek and its tributaries at a proposed coal conveyor, ROM pad and haul road. **Bonnacci/ Anglo Coal.**

BELVEDERE COAL MINE, WATER SUPPLY INVESTIGATION, QUEENSLAND (2006)

Investigation of surface water supply options for the proposed Belvedere Coal Mine. **Rio Doce Australia Pty Ltd**

NARRABRI COAL MINE STAGE 1 EA, SURFACE WATER MANAGEMENT STUDIES, NEW SOUTH WALES (2006)

Undertaking the surface water component of an Environmental Impact Assessment for the proposed new underground coal mine at Narrabri. A flood study and stormwater management plan was developed for the site. A water balance model was developed to design

the size of evaporation basins and an irrigation management plan was developed to manage the significant volumes of highly saline water that was expected from underground. **Narrabri Coal Pty Ltd**

TENNANT HEAP LEACH OPERATIONS STORMWATER MANAGEMENT PLAN, QUEENSLAND (2006)

Estimation of heap leach stormwater pond storage volumes to satisfy EPA requirements. **Tennant Limited**

NORTHPARKES MINE EXTENSION EIS, NEW SOUTH WALES (2005-2006)

Preparation of a surface water management plan for the extended mine site and estimation of the mine site water balance for pre and post extension mining activities. **Northparkes.**

GLENNIES CREEK MINE SUBSIDENCE STUDY, NEW SOUTH WALES (2005)

Estimation of the impact of Glennies Creek mine subsidence on Betty's Creek flood behaviour and creek erosion. Undertake the surface water component of an Environmental Impact Assessment for the proposed extension. **Integra Coal Pty Ltd (formally Glennies Creek Coal Management Pty Ltd)**

PINEDALE COAL MINE FLOOD STUDY, NEW SOUTH WALES (2005)

Estimation of flood levels along Neubecks Creek and Coxs River across the Pine Dale Coal Mine, near Lithgow. A series of levees were designed to protect the proposed mine from floodwater. **Enhance Place Pty Ltd**

GREAT AUSTRALIA MINE WATER MANAGEMENT STUDY, QUEENSLAND (2004)

Development of a concept design of a tailings storage facility and water recycle management system for the proposed Great Australia Mine. A flood study of the adjacent Coppermine Creek was prepared. **Exco Resources NL**

ARDLETHAN TIN MINE SURFACE WATER MANAGEMENT, NEW SOUTH WALES (2004)

Development of a surface water management plan for the proposed White Crystal Lead alluvial tin operation. The plan incorporated a series of diversion drains and detention basins that are to be used during mining and following the closure of the mine. The plan forms part of the EIS for the project. **Telminex NL**

KARREMAN QUARRY WATER BALANCE INVESTIGATION, QUEENSLAND (2003)

Development of a Water Balance Model of the various storages, pumps and operational rules of Karreman Quarry to assess the impact on releases to Tingalpa Creek and the reliability to meet water requirements. Water balances of existing development conditions, proposed development conditions and post quarrying development conditions were investigated. Post quarry development conditions determined the time it takes for the final voids to fill and spill. The Integrated Quantity Quality Model (IQQM) was used for the analyses. **Karreman Quarry.**

GLEN WILGA COAL MINE AUDIT, QUEENSLAND (2002)

Peer review the flooding and storm water management measures proposed for the Glen Wilga Coal Mine located on the Condamine River floodplain. A two dimensional flood model of the Condamine River was developed to assess the impact of proposed flood protection levees. **Tarong Energy**

ERNEST HENRY MINE SURFACE WATER MANAGEMENT, QUEENSLAND (2002)

Development of a surface water management plan for the waste dumps and tailings dams at Ernest Henry Mine. Diversion drains and erosion control measures were developed. **MIM**

SELWYN MINE WATER STORMWATER MANAGEMENT AND WATER SUPPLY STUDY, QUEENSLAND (2002)

Development of a rainfall runoff model and a water balance model to investigate options to supply minesite makeup water from stormwater runoff. A conceptual design of a new water supply dam including spillway was developed. **Selwyn Mine**

ADLAY NICKEL SURFACE WATER MANAGEMENT PLAN, PHILIPPINES (2001)

Development of a surface water management plan for the Adlay Nickel Mine in Southern Philippines. The plan consisted of several diversion drains to separate clean and dirty runoff and a series of sediment basins to treat dirty runoff from a site that receives 5 metres of rainfall per year. A flood study of the Hinadladan River was undertaken to design the fill platform for the mine infrastructure. **QNI Resources.**

LADY LORETTA MINE SURFACE WATER MANAGEMENT PLAN, QUEENSLAND (2000)

Development of a preliminary surface water management plan for the proposed Lady Loretta Mine. Conceptual designs of sediment dams and containment dams were developed for all 'dirty' runoff and 'contaminated' runoff areas respectively. Development of Sacramento rainfall runoff models and daily water balance models (IQQM) of two catchments to determine the hydrological feasibility of two dam options to supply water to the proposed Lady Loretta Mine. **Noranda P/L.**

SAND AND SOIL QUARRY SEDIMENT AND EROSION CONTROL PLAN, NEW SOUTH WALES (2000)

Development of a sediment and erosion control plan for the proposed extension to the Sand and Soil Quarry at Menangle. Measures were developed to reduce the impact of flooding from the Nepean River and local flooding from the surrounding area. The plan was approved by the NSW EPA and DLWC. **The Strategic Partners Group**

COOLJARLOO MINE REHABILITATION PLAN, WESTERN AUSTRALIA (2000)

Development of an end of mine rehabilitation plan of Cooljarloo mineral sands mine, near Cataby. The old overburden dump was re-contoured to contain drainage lines and ridges to match the surrounding landscape. Cut and fill volumes were estimated using GIS. Interim sediment control measures were developed to minimise downstream sedimentation until the final landform could be completed. **TIWEST**

SURFACE WATER MANAGEMENT SYSTEM, CHATREE GOLD DEPOSIT, THAILAND (1999)

Design of a surface water management plan for the proposed Chatree Gold Mine to enable reuse of runoff water for mineral processing. Design and sizing of storages using a water balance model. **Coffey Geosciences Pty Ltd**

BEGA ROAD SOLID WASTE DUMP SEDIMENT AND EROSION CONTROL PLAN, QUEENSLAND (1999)

Development of an operation plan for the proposed solid waste dump to manage drainage runoff during the various stages of landfill. Effective sediment and erosion control measures were developed to ensure full compliance with regulations and minimal impact on the long term management of the proposed dump. **Logan City Council**

TIMBARRA MINE STORMWATER MANAGEMENT MONITORING, NEW SOUTH WALES (1998)

Development of a monitoring program for the upgrade of the Timbarra Road through an environmentally sensitive area. Undertaking a monthly audit of the works through the construction program. Advice was provided to improve sediment and erosion control management of the upgrade to ensure best management practices are adhered to. **Ross Mining NL**

LONDONDERRY CLAY QUARRY WATER MANAGEMENT AUDIT, NEW SOUTH WALES (1998)

Undertake an audit of the water management and sediment and erosion control measures utilised at the quarry. Estimate the size and adequacy of the existing sediment dams on site. **Londonderry Clay Quarry**

GOLD RIDGE MINE STORMWATER MANAGEMENT PLAN, SOLOMON ISLANDS (1998)

Audit erosion control techniques used during construction of the Gold Ridge Mine. Environmental Officers were trained to audit and understand the erosion processes and erosion control techniques at the site. **Ross Mining NL**

MOURA MINE WATER MANAGEMENT PLAN, QUEENSLAND (1998)

Development of a daily water balance model of 30 inter-connected open cut pits and dams to simulate daily water quantity and quality behaviour of Moura Open Cut Coal Mine. The model was used to investigate various management strategies, including enlarging certain dams, controlled releases and directing inflows past particular storages. **BHP Moura Mine**

TIMBARRA MINE WATER SUPPLY STUDY, NEW SOUTH WALES (1997)

Assessment of capacity and reliability of local creeks to meet the minesite water demand of Timbarra Gold Mine by undertaking a series of stream gaugings to measure baseflows and comparing to recent rainfall behaviour. An Environmental Effects Statement for the proposed water supply system was prepared for the licence application. **Ross Mining NL**

Flood studies

NAMOI RIVER FLOOD STUDY NEW SOUTH WALES (2012, 2018, 2022)

Developed and calibrated a TUFLOW two dimensional hydraulic model of the Namoi River from Gunnedah to Boggabri to assess the impact of a proposed rail spur on the Namoi River Floodplain Management Plan. **Whitehaven**

BOGGABRI FLOOD STUDY NEW SOUTH WALES (2021)

Defined the flood risk at Boggabri from Coxs Creek and the Namoi River using XP-RAFTs and TUFLOW. The models were calibrated to five historical events. Flood depth and hazard maps were developed for a range of design events. **Narrabri Shire Council**

INLAND RAIL G2K TENDER DESIGN FLOODING ASSESSMENT, QUEENSLAND (2020 TO 2021)

Updated existing TUFLOW hydraulic models to assess the major bridge crossings along the proposed Inland rail (Gowrie to Kagaru) alignment. Hydraulic modelling was undertaken for Teviot Brook, Purga Creek, Warrill Creek, the Bremer River, Lockyer Creek and Gowrie Creek. This assessment was undertaken to identify opportunities to optimise the length of the proposed bridges while satisfying flood impact objectives. **HATCH Pty Ltd (as part of the G2K Connect tender design team)**

EUMUNGERIE VILLAGE FLOOD STUDY, NARRABRI NEW SOUTH WALES (2019)

Defined the flood risk at Eumungerie from Drillwarrina Creek and Coolbaggie Creek in Central NSW using XP-RAFTs and MIKE FM. The model was calibrated to two historical events. Flood depth and hazard maps were developed for a range of design events. **Dubbo Regional Council**

ISAAC RIVER FLOOD STUDY QUEENSLAND (2019)

Determined the flood risk from the Isaac River and Eureka Creek for the Goonyella Riverside and Broadmeadow mines. A RAFTS and TUFLOW models were developed for the study. **Anglo Coal**

NORTH MACKAY URBAN STORMWATER DRAINAGE STUDY QUEENSLAND (2018)

Developed rain-on-grid TUFLOW hydraulic model of North Mackay to assess a range of potential flood mitigation options. **Mackay Regional Council**

PIONEER RIVER FLOOD STUDY UPDATE QUEENSLAND (2018)

Updated the Pioneer River flood hydrology in accordance with Australian Rainfall and Runoff 2016 update. The model was verified against the Tropical Cyclone Debbie event. **Mackay Regional Council**

MACKAY CITY CBD FLOOD STUDY QUEENSLAND (2018)

Developed a rain-on-grid TUFLOW model of the Mackay CBD and Mackay South, East and West. The model was calibrated to the 2008 flood and incorporates Australian Rainfall and Runoff 2016 hydrology. The model was used to set design flood levels for a local storm event, a Pioneer River overflow event and a dynamic storm tide. **Mackay Regional Council**

NAMOI RIVER FLOOD STUDY, NARRABRI NEW SOUTH WALES (2016)

Defined the flood risk at Narrabri from the Namoi River using MIKE FM. The model was calibrated to three historical events at three stream gauges. Flood depth and hazard maps were developed for a range of design events. **Narrabri Shire Council**

MULGATE CREEK FLOOD STUDY, NARRABRI NEW SOUTH WALES (2016)

Defined the flood risk at Narrabri from Mulgate Creek using XP-RAFTs and MIKE FM. The model was calibrated to two historical events. Flood depth and hazard maps were developed for a range of design events. **Narrabri Shire Council**

MOREE AND ENVIRONS FLOOD STUDY, NEW SOUTH WALES (2016)

Defined the flood risk along the Gwydir and Mehi rivers at Moree and surrounds using MIKE FM. The model was calibrated to three historical events at seven stream gauges across a very complex floodplain. **Moree Plains Shire Council**

SADDLERS CREEK FLOOD STUDY NEW SOUTH WALES (2015)

Determined the flood risk from Saddlers Creek, a tributary of the Hunter River for the proposed Drayton South Mine using the RAFTS and HEC-RAS models. **Anglo Coal**

CONDAMINE RIVER FLOOD STUDY QUEENSLAND (2014)

Developed an URBS hydrologic model of the Condamine River to Chinchilla. The model was calibrated to seven stream gauges for four historical floods. A TUFLOW 2D hydraulic model of the Condamine River was developed to estimate design flood levels for large and rare floods. **CS Energy**

TOMAHAWK AND NORTH CREEK FLOOD STUDY QUEENSLAND (2014)

Determined the flood risk along Tomahawk and North Creek (and tributaries) across the proposed Project China Stone Mine in the Gallilee Basin using the RAFTS and TUFLOW models. **Macmines Austasia Pty Ltd**

GERMAN CREEK FLOOD STUDY QUEENSLAND (2014)

Determined the flood risk along German Creek and Cattle Creek across the German Creek mining complex using the RAFTS and TUFLOW models. **Anglo American Metallurgical Coal**

AMAGULA AND EMERALD RIVER FLOOD STUDY NORTHERN TERRITORY (2014)

Determined the flood risk for a proposed expansion to the Manganese Mine on Groote Eyelandt in the Gulf of Carpentaria using the RAFTS and TUFLOW models. **BHP Billiton Manganese Australia Pty Ltd**

BOX CREEK FLOOD STUDY NEW SOUTH WALES (2014)

Determined the flood risk for a proposed mineral sands mine in Box Creek, a distributary of the Lower Lachlan River from an analysis of historical flows and a TUFLOW hydraulic model. **Bogan Shire Council**

BOGAN RIVER AT NYNGAN FLOOD STUDY NEW SOUTH WALES (2014)

Determined the flood risk for the areas outside the town levee from an annual series flood frequency analysis of recorded flows and a TUFLOW hydraulic model of the Bogan River at Nyngan. **Bogan Shire Council**

OORALEA DEVELOPMENT AREA FLOOD STUDY QUEENSLAND (2014)

Developed a RAFTS rainfall runoff model and a TUFLOW hydraulic model of Bakers One catchment through the proposed Ooralea Development Area, near Mackay to determine development constraints. **Mackay Regional Council**

ISAAC RIVER CHERWELL CREEK FLOOD STUDY QUEENSLAND (2013)

Determined the flood risk along the Isaac River, Cherwell Creek, Grosvenor Creek (and tributaries across the proposed Moranbah South Project area, near Moranbah using the RAFTS and TUFLOW models. **Anglo American Metallurgical Coal**

HAIL CREEK FLOOD STUDY QUEENSLAND (2013)

Determined the flood risk along Hail Creek across the Hail Creek Mine using the RAFTS and TUFLOW models. **Anglo American Metallurgical Coal**

BLACKWATER CREEK FLOOD STUDY QUEENSLAND (2013)

Determined the flood risk along Blackwater and Taurus creeks across the proposed Minyango Coal Mine using the RAFTS and TUFLOW models. **Blackwater Coal Pty Ltd**

BAKERS CREEK FLOOD STUDY QUEENSLAND (2013)

Developed a RAFTS rainfall runoff model and a TUFLOW hydraulic model of Bakers Creek through the township of Walkerston to determine design flood levels. **Mackay Regional Council**

NAMOI RIVER FLOOD STUDY NEW SOUTH WALES (2012)

Developed and calibrated a TUFLOW two dimensional hydraulic model of the Namoi River from Gunnedah to Boggabri to assess the impact of a proposed rail spur on the Namoi River Carroll to Boggabri Floodplain Management Plan. **Coalworks**

MCCREADYS CREEK FLOOD STUDY QUEENSLAND (2011)

Developed a RAFTS rainfall runoff model and a TUFLOW hydraulic model of the McCrearys Creek catchment to develop concept designs of trunk infrastructure for proposed future development. **Mackay Regional Council**

PIONEER RIVER FLOOD STUDY QUEENSLAND (2011)

Developed an URBS rainfall runoff model and a TUFLOW hydraulic model of the Pioneer River to determine design flood levels for the Mackay Region. **Mackay Regional Council**

HUNTER RIVER FLOOD STUDY NEW SOUTH WALES (2010)

Developed a TUFLOW hydraulic model of the Hunter River to determine the impact of proposed flood protection levees for the Carrington West Wing Extension. **Coal & Allied Operations Pty Ltd**

ISAAC RIVER FLOOD STUDY QUEENSLAND (2009)

Developed an XP-RAFTS rainfall runoff model and a TUFLOW hydraulic model of the Isaac River and Cherwell Creek at the proposed Isaac Plains South mine to determine the impact of mine infrastructure and flood protection levees on flood levels and creek erosion potential. **Isaac Plains Coal**

NAMOI RIVER FLOOD STUDY NEW SOUTH WALES (2009)

Developed a TUFLOW hydraulic model of the Namoi River to assess the impact of a proposed rail crossing for the Boggabri Coal Mine. **Boggabri Coal**

ROPER CREEK FLOOD STUDY QUEENSLAND (2008)

Developed a TUFLOW model of Roper Creek at the Middelmount Coal Mine to determine the impact of mine infrastructure and flood protection levees on flood levels and creek erosion potential. **Middelmount Coal**

EINASLEIGH RIVER FLOOD STUDY QUEENSLAND (2008)

Developed an URBS rainfall runoff routing model and a TUFLOW model of the Einasleigh River and Coppermine Creek at Einasleigh. **Copperstrike**

LOGAN RIVER FLOOD STUDY QUEENSLAND (2007)

Modified a TUFLOW2D model of the Logan River to assess the impact of a proposed sand quarry. **Byrne Earthmoving**

BRISBANE RIVER HYDROLOGICAL STUDY QUEENSLAND (2007)

Estimated design flood discharges along the Brisbane River for events ranging from the 2000-year ARI to the PMF design floods. Estimated design flood discharges using the WT42D rainfall runoff routing model, two dam routing models and the Mike 11 hydraulic model. **Brisbane City Council**

TERRORS CREEK FLOOD MITIGATION PROJECT, DAYBORO QUEENSLAND (2007)

Developed a RAFTS rainfall runoff routing model and a MIKE FLOOD 2D hydrodynamic model of Terrors Creek and its tributaries. **Pine Rivers Shire Council**

BRISBANE RIVER FLOOD STUDY, MT CROSBY WEIR QUEENSLAND (2007)

Developed concept designs of various weir upgrade options for Mt Crosby Weir on the Brisbane River. Assessed hydraulic impacts of the weir options using the Mike 11 model. **Brisbane Water**

WESTERN CREEK FLOOD STUDY, AUCHENFLOWER QUEENSLAND (2007)

Developed a TUFLOW 2D hydraulic model of lower Western Creek catchment, a highly urbanised area, to determine design flood levels at a proposed development site. Included concrete-lined drains and stormwater pipes to model both major flooding from Western Creek and local catchment runoff draining into the creek. **MDEV Property Group**

GERMAN CREEK FLOOD STUDY QUEENSLAND (2007)

Developed a RAFTS rainfall runoff routing model and an unsteady HEC-RAS hydraulic model of German Creek and its tributaries to estimate design flood levels for a new coal conveyor at the proposed Lake Lindsay Mine. **Bonnacci/Anglo Coal**

TODD RIVER FLOOD MAPPING STUDY, ALICE FARMS AREA, NORTHERN TERRITORY (2006)

Developed and calibrated an URBS hydrological model and TUFLOW 2D hydraulic model of the Todd River downstream of Alice Springs. **NT Department of Planning and Infrastructure**

GLENNIES CREEK/BETTYS CREEK FLOOD STUDY AND MINE SUBSIDENCE STUDY, NEW SOUTH WALES (2006)

Developed and calibrated an URBS hydrologic model and HEC-RAS hydraulic models of Glennies Creek and Bettys Creek. Assessed impact of mine subsidence on flooding and channel degradation. **Glennies Creek Colliery**

BRISBANE RIVER FLOOD STUDY, REDBANK PENINSULA QUEENSLAND (2006)

Modified a Mike 11 model of the Brisbane River to assess the impact of the proposed 75 ha Redbank River Park Industrial development on flood levels. Developed a drainage master plan for the site to meet council's water quality and quantity objectives using water-sensitive urban design. **ING Management Pty Ltd**

CONDAMINE/KOGAN CREEK FLOOD STUDY QUEENSLAND (2003–2006)

Developed URBS hydrologic models and a TUFLOW 2D hydraulic model of the Condamine River and Kogan Creek to determine the impact of the Kogan Creek power station and coal mine. Designed stream diversion and bridge crossing. **CS Energy**

MOUNT JOHNS VALLEY DRAINAGE MASTER PLAN NORTHERN TERRITORY (2005)

Prepared a drainage master plan for the proposed Mount Johns Valley urban development in Alice Springs using water-sensitive urban design principles. Developed RAFTS hydrological model of the catchment to design and size a series of detention basins and a HEC-RAS model of the main trunk drain. Developed concept designs of drainage channels for the site. **QMCW/Department of Planning and Infrastructure**

NEUBECKS CREEK/COX'S RIVER FLOOD STUDY NEW SOUTH WALES (2005)

Prepared a floodplain management plan of Neubecks Creek and Cox's River for the Pine Dale Coal Mine. Estimated design flood flows and flood levels and assessed the impact of flood protection levees on flood levels and creek erosion measures. **Enhance Place Pty Ltd**

SOMERSET DAM BREAK FLOOD RISK STUDY QUEENSLAND (2004)

Estimated design discharges for events ranging from the 50-year ARI to the probable maximum flood at the dam. Developed breach hydrographs for 2 concrete dam-failure mechanisms and several gate-failure scenarios. Assessed the impact of Somerset Dam failure on the safety of Wivenhoe Dam located immediately downstream. **SEQ Water**

WIVENHOE DAM BREAK FLOOD RISK STUDY QUEENSLAND (2003–2005)

Estimated Wivenhoe Dam breach hydrographs for several auxiliary spillway designs. The breach hydrographs were routed through a Mike 11 model of the Brisbane River downstream of the dam to Moreton Bay to determine flood extents and flood wave travel times. **SEQ Water**

SPRINGFIELD TOWN CENTRE DRAINAGE MASTER PLAN FLOOD STUDY, QUEENSLAND (2004)

Developed an URBS rainfall runoff routing model and HEC-RAS hydraulic model to estimate design discharges and design flood levels for the proposed new Springfield Town Centre. Design discharges were used to set development levels throughout the area. Investigated several development scenarios to determine the construction timing of various detention basins. **Springfield Land Corporation**

BRISBANE RIVER FLOOD STUDY, WIVENHOE DAM QUEENSLAND (2003–2004)

Estimated design flood discharges at Wivenhoe Dam using the WT42D rainfall runoff routing models for floods up to the probable maximum flood to design an auxiliary spillway. Investigated the impact of GTSM-R temporal patterns on design flows. Developed a MIKE 11 model of the Brisbane River to estimate design flood levels from Wivenhoe Dam to Moreton Bay for floods up to the probable maximum flood. **SEQ Water**

CORNMEAL CREEK FLOOD STUDY QUEENSLAND (2003)

Estimated design flood levels along Cornmeal Creek for various development scenarios of Wises Farm using the MIKE 11 hydraulic model. **Eraland Consulting**

WIVENHOE DAM SPILLWAY HYDRAULIC INVESTIGATION QUEENSLAND (2003)

Developed a TUFLOW 2D hydraulic model of the Brisbane River from Wivenhoe Dam to Fernvale to estimate maximum velocities and potential scour for various spillway locations and configurations. **SEQ Water**

IBERIA STREET CATCHMENT FLOOD STUDY NEW SOUTH WALES (2002)

Estimated peak discharges, flood levels and extent of flooding along a heavily urbanised tributary of Saltpan Creek for events ranging from the two-year ARI to the probable maximum flood. A DRAINS rainfall runoff pipe network model and a TUFLOW fully 2D model were developed. **Bankstown City Council**

TALLOW CREEK FLOOD STUDY NEW SOUTH WALES (2002)

Estimated peak discharges and flood levels along Tallow Creek, near Byron Bay for events ranging from the two-year to the probable maximum flood. A RAFTS rainfall runoff model of the catchment and a TUFLOW fully 2D hydraulic model of the creek were developed.

Byron Shire Council

CANNONVALE CATCHMENT FLOOD STUDY — WHITSUNDAY SHIRE, QUEENSLAND (2002)

Developed a RAFTS hydrologic model for the 13 km² Galbraith and Waite Creek Catchments near Airlie Beach, Whitsunday Shire. Involved assessing discharges at key locations under the existing and full catchment development conditions. **MWH/Whitsunday Shire Council**

MOORE RIVER FLOOD STUDY, MOORA WESTERN AUSTRALIA (2000)

Estimated peak discharges and flood levels throughout the township of Moora for a range of flood events from the two-year ARI to the probable maximum flood along both the Moore River and Yadgena Brook. An URBS hydrologic model of the Moore River and a MIKE 11 hydraulic model of Moora township were developed and calibrated to the March, May and August 1999 floods. **WA Water and Rivers Commission**

ROSS CREEK FLOOD STUDY, THORNLANDS QUEENSLAND (2001)

Developed a RAFTS hydrological model of Ross Creek to estimate discharge hydrographs at a proposed new housing development.

Developed a TUFLOW fully 2D hydraulic model and a HEC-RAS 1D model of the site to estimate peak flood levels and flood velocities. **AV Jennings**

HINADLADAN AND TANDAWA RIVER FLOOD STUDY, ADLAY PHILIPPINES (2001)

Estimated peak discharges and flood levels along the Hinadladan and Tandawa rivers in the Southern Philippines where annual rainfalls exceed 5 m. Assessed the impact of blocking up to one-third of the floodplain on peak flood levels at a nearby highway crossing. Developed an URBS hydrological and Mike 11 quasi- 2D hydraulic model of the two creeks. **QNI Resources**

BOWMANS CREEK FLOOD STUDY, RAVENSWORTH NEW SOUTH WALES (2001–2002)

Assessed two bridge renewal options over Swamp Creek, a tributary of Bowmans Creek. Developed an URBS hydrologic model and steady and unsteady state HEC-RAS models of the two streams to assess the impact of local flooding from Swamp Creek and regional flooding from Bowmans Creek. **Rail Services Australia**

TALLAWANG CREEK FLOOD STUDY NEW SOUTH WALES (2000)

Estimated the risk of Tallawang Magnetite Mine being inundated from Tallawang Creek. Developed peak design discharges and a HEC RAS hydraulic model of Tallawang Creek. **RW Corkery**

KOBA RIVER FLOOD STUDY INDONESIA (1999)

Estimated the impact on peak discharges of a proposed dam on the Koba River, North Sulawesi using the 'RFRT' rainfall-runoff routing program. **Aurora Gold**

HYDRAULIC STUDY, BATUPUNGAH RIVER BRIDGE INDONESIA (1999)

Developed several conceptual designs of a proposed haul road crossing over the Batupungah River, in North Sulawesi. Batupungah River experiences frequent flash flooding with high bedload concentrations. The hydraulic capacities of various high-, medium- and low-level bridge crossings were analysed using the HEC-RAS hydraulic model. **Aurora Gold**

HYDRAULIC STUDY MYANMAR (1999)

Developed conceptual designs of eight culvert crossings along a proposed access road along the Myanmar–Thailand gas pipeline. High-level and low-level configurations were analysed using both pipe nomographs and hydraulic modelling. **Coffey Geosciences Pty Ltd**

SIRIUS CREEK FLOOD STUDY, TOGARA NORTH QUEENSLAND (1997)

Estimated flood levels along Sirius Creek at the proposed Togara North Mine site using the HEC-RAS model. Developed conceptual designs of the inlet structures to the underground mine to prevent the mine from being inundated. Assessed the impact on flood levels to neighbouring properties. **Togara North Joint Venture**

MIDDLE CREEK FLOOD STUDY, SAWTELL NEW SOUTH WALES (1997)

Developed a 'RORB' rainfall-runoff routing model of Bonville Creek to estimate design discharges at Hulberts Road, Sawtell. **Coffs Harbour City Council**

LACHLAN RIVER AT SOUTHERN CROSS FLOOD STUDY, FORBES, NEW SOUTH WALES (1996)

Developed a HEC-RAS hydraulic model of the Lachlan River floodplain to assess the impact of a levee blocking the Buyuma floodway. The model was calibrated to the October 1996 and August 1990 flood events. **NSW Department of Land and Water Conservation**

TUPPAL AND BULATALE CREEK FLOOD STUDY NEW SOUTH WALES (1996)

Developed and calibrated a quasi- 2D unsteady flow model (MIKE 11) of Tuppal and Bulatale creeks to assess the impact of a proposed levee on flood behaviour. The model was calibrated to the October 1993 flood. **NSW Department of Water Resources**

BORDER RIVERS FLOOD MONITORING NEW SOUTH WALES (1996)

Collected flood levels, took aerial photographs and monitored the impacts around the towns of Goondiwindi and Mungindi and other floodplain developments of the January 1996 MacIntyre River flood. Collated information into a detailed flood behaviour report. **Department of Land and Water Conservation**

Floodplain management studies

NARRABRI FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN NEW SOUTH WALES (2018-2023)

Flood models were developed of the Namoi River and the local catchments to set design flood levels and a flood planning area for Narrabri and surrounds. The models were also used to assess a range of flood mitigation options for the township. **Narrabri Shire Council**

EUMUNGERIE FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN NEW SOUTH WALES (2020-2021)

Flood models were developed of the local catchments to set design flood levels and a flood planning area for Eumungerie and surrounds. The models were also used to assess a range of flood mitigation options for the township. Flood planning measures were developed to manage the future flood risk. **Dubbo Regional Shire Council**

MACKAY FLOODPLAIN MANAGEMENT STUDY, MACKAY QUEENSLAND (2017-2019)

The City of Mackay and adjacent areas are susceptible to flooding from the Pioneer River, Goosepond Creek and Bakers Creek, local catchment stormwater inundation and storm tide inundation. The flood studies developed for each flood source was updated and a comprehensive flood risk assessment for Mackay was prepared. Flood vulnerability mapping and flood damage modelling, including the development of site specific flood damage curves, were used to assess a range of structural and non-structural flood mitigation options for the city. **Mackay Regional Council**

MOREE AND ENVIRONS FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN NEW SOUTH WALES (2015-17)

Flood models were developed to set design flood levels and a flood planning area for Moree and Environs. The models were also used to assess a range of flood mitigation options including a flood levee for Moree. **Moree Plains Shire Council**

NYNGAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN NEW SOUTH WALES (2017)

Defined and evaluated the flood risk for the township of Nyngan. Assessed a range of structural and non-structural flood mitigation measures for the township and developed emergency response planning measures. **Nyngan Shire Council**

PROJECT STONE COAL PROJECT FLOOD RISK MANAGEMENT STUDY QUEENSLAND (2014)

Developed a series of diversion drains and flood levees to protect the open cut mining areas on the Project Stone Coal mine in the Gallilee Basin. A RAFTS rainfall runoff model and a TUFLOW hydraulic model were developed to assess the flood risk management strategies.

Macmines Austasia Pty Ltd

MACKAY RING ROAD PLANNING STUDY QUEENSLAND (2013)

Provided hydrological and hydraulic modelling advice to the study team, led by AECOM, on the proposal to construct a ring road around Mackay that would cross 10 watercourses. Developed concept designs of the waterway crossings for costing various options. Undertook hydraulic modelling of the various designs to assess flood impacts. **Department of Transport and Main Roads**

OORALEA DEVELOPMENT AREA TRUNK INFRASTRUCTURE STUDY QUEENSLAND (2013/2015)

Developed concept designs of future trunk drainage infrastructure for the proposed Ooralea Development Area near Mackay. A RAFTS rainfall runoff model and a TUFLOW hydraulic model were developed to assess the concept designs. **Mackay Regional Council**

MCCREADYS CREEK SOUTH CATCHMENT TRUNK INFRASTRUCTURE STUDY QUEENSLAND (2011)

Developed a RAFTS rainfall runoff model and a TUFLOW hydraulic model of McCreadys Creek to determine design flood levels and develop concept designs of future trunk drainage infrastructure. **Mackay Regional Council**

MOUNT CROSBY WEIR DAM BREAK INVESTIGATION QUEENSLAND (2007)

Undertook 3 sunny-day failure impact assessments of Mount Crosby Weir, the main water supply storage for Brisbane and Ipswich. **Brisbane Water**

TALLOW CREEK FLOOD MITIGATION STUDY NEW SOUTH WALES (2008)

Developed a flood mitigation strategy for Tallow Creek at Suffolk Park and Byron Hills. Developed concept designs of stormwater drains and detention basins to mitigate existing flood problems. Assessed the concept designs using the XP-RAFTS and TUFLOW models. **Tain Investments and Byron Shire Council**

TERRORS CREEK FLOOD MITIGATION PROJECT, DAYBORO QUEENSLAND (2007)

Assessed flood management options for the town of Dayboro using the RAFTS hydrologic rainfall-runoff-routing model and the MIKE FLOOD 2D hydraulic model. Used model results in a flood-damage model established to undertake an economic evaluation of 13 flood management options. Assessed social, environmental and cost/benefit analysis of the various management options. **Pine Rivers Shire Council**

WIVENHOE DAM GATE OPERATION PROCEDURES QUEENSLAND (2004)

Developed modifications to floodgate operating procedures for Wivenhoe Dam to incorporate a new auxiliary spillway. The procedures were used to mitigate flooding and flood damage through Brisbane and Ipswich. Used flood routing and MIKE 11 modelling of downstream areas to develop optimum operating procedures to minimise flood damage and improve dam safety. **Seqwater**

BRISBANE RIVER FLOOD DAMAGE STUDY QUEENSLAND (2006)

Estimated flood levels and flood extents along the Brisbane River and Lockyer Creek in Esk Shire to estimate potential flood damage in the Brisbane Valley from Brisbane River flooding, as part of a study to assess the operation rules for the Wivenhoe Dam floodgates. The results

of the study were used to determine whether the rules could be modified to reduce flood damage in the valley. **Brisbane and Ipswich City and Esk Shire Councils**

STRUCTURAL DAMAGE SURVEY NORTHERN NEW SOUTH WALES (2001)

Undertook structural flood-damage survey of several 'modern' houses flooded above floor level in the Maclean area following the March 2001 Clarence River flood. Undertook detailed house inspections and resident interviews to identify potential high-cost replacement items in an attempt to reduce future flood damage costs. **NSW Department of Land and Water Conservation**

WOLLONGONG FLOOD MAPPING AND FLOOD DAMAGE STUDY, NEW SOUTH WALES (2001)

Developed 'extent of flooding' maps and estimated representative average annual flood-damage values for residential properties in Wollongong. Flood-damage estimates were made for home and contents damages. This information was used to develop a flood insurance product offered to the residents of Wollongong. **CGU Insurance**

ALIPOU CREEK FLOODPLAIN MANAGEMENT STUDY NEW SOUTH WALES (2001)

Assessed the impact on flood levels and duration of flooding of several flood mitigation options in the Alipou Creek basin using the quasi-2D hydraulic model previously developed by Water Studies. Options included removing road culverts and installing pipelines through levees. Assessed and presented the benefits and costs of each proposal to local community groups. **Clarence River County Council**

MOORA FLOODPLAIN MANAGEMENT STUDY WESTERN AUSTRALIA (2000)

Developed a comprehensive floodplain management plan for Moora township in response to the March, May and August 1999 floods. Flood-damage costs were estimated for a range of design floods using the FLDAMAGE model. Flood levels throughout the town were estimated using the MIKE 11 hydraulic model. Determined the impact on flood levels and flood damage costs of several management options, such as two detention basins, levees and creek widening. A range of non-structural flood mitigation options were developed to reduce future flood damage costs. Public consultation was undertaken to address community concerns. **WA Water and Rivers Commission**

TENTHILL CREEK FLOODPLAIN MANAGEMENT STUDY, GATTON QUEENSLAND (1999)

Developed options for a community working group to resolve local drainage problems along Tenthill Creek Road. The advantages and disadvantages of each option were outlined in a discussion paper to help the community working group decide on an appropriate solution. **Lockyer Catchment Centre**

LOCKYER CREEK FLOOD SCOPING STUDY QUEENSLAND (1998)

Assessed flooding and erosion issues in the Lockyer Creek catchment. Identified and documented various flooding issues following a community consultation process. Undertook more detailed investigations of four of the identified issues. **Lockyer Catchment Management Committee**

BORDER RIVERS FLOOD DAMAGE STUDY NEW SOUTH WALES (1997)

Developed a generic rural flood-damage model to assess rural flood damage following the January 1996 floods in the Border Rivers. **NSW Department of Land and Water Conservation**

LOWER MIRROOL CREEK FLOODPLAIN MANAGEMENT STUDY, NEW SOUTH WALES (1997)

Investigated options to improve the drainage and flooding problems downstream of Barren Box Swamp below the Murrumbidgee Irrigation Area. Liaised with members of the farming community and local department operations and environmental staff to develop improved operating rules and floodway guidelines for Barren Box Swamp. **Murrumbidgee Irrigation**

River engineer studies

ROPER CREEK DIVERSION FUNCTIONAL DESIGN QUEENSLAND (2019)

Developed a functional design of a realignment of the Roper Creek channel at Middlemount Coal mine. **Middlemount Coal Pty Ltd**

ENSHAM MINE RESIDUAL VOID STUDY GEOMORPHIC IMPACT ASSESSMENT QUEENSLAND (2018)

Assessed the potential geomorphic impacts of a range of final landform scenarios of the Ensham mine on the Nogoia River and its floodplain. **Ensham Resources Pty Ltd**

SARAJI EAST PROJECT STREAM DIVERSION PEER REVIEW QUEENSLAND (2018)

Undertook an independent review of potential stream diversion options of Phillips Creek and Spring Creek for the Saraji East Project. **BMA Coal Operations Pty Ltd**

THIRTEEN MILE GULLY REALIGNMENT CONCEPT DESIGN QUEENSLAND (2018)

Developed a functional design of a realignment of a stream diversion of Thirteen Mile Gully for the Middlemount Coal mine. **Middlemount Coal Pty Ltd**

MORANBAH NORTH MINE EXPANSION GEOMORPHIC ASSESSMENT AND MINE SUBSIDENCE IMPACT STUDY QUEENSLAND (2018)

Undertook hydraulic and geomorphic characterisation of Teviot Brook and Skeleton Gully and assessed the impact of mine subsidence on flooding and geomorphic behaviour. **Anglo American Metallurgical Coal Pty Ltd**

FLYING DOCTOR MINE STREAM DIVERSION DESIGN NEW SOUTH WALES (2017)

Developed concept designs of two stream diversions of minor gullies draining the proposed Flying Doctor Mine. The designs of the proposed channels were based on the hydraulic and geomorphic characteristics of the existing channels that were replaced. **Perilya Broken Hill Pty Ltd**

PROJECT CHINA STONE – EIS OPEN CUT MINE DRAINAGE, QUEENSLAND (2014)

Developed detailed hydrologic and two-dimensional hydraulic models of proposed highwall diversion drains to convey runoff from upstream catchments around proposed open cut mining areas at the Project China Stone site. The hydraulic models were used to investigate the hydraulic characteristics of the drainage features that were being diverted, and ensure the designs of the diversion drains replicated (where possible) the existing drainage features. The hydraulic models were also used to investigate the impact of the proposed diversion drains on neighbouring landholders and downstream watercourses. **Hansen Bailey**

AQUILA AND GRASSTREE MINE GEOMORPHIC ASSESSMENT AND MINE SUBSIDENCE IMPACT STUDY QUEENSLAND (2013)

Undertook hydraulic and geomorphic characterisation of German Creek and Cattle Creek and assessed the impact of mine subsidence. **Anglo American Metallurgical Coal Pty Ltd**

MINYANGO PROJECT GEOMORPHIC ASSESSMENT AND MINE SUBSIDENCE IMPACT STUDY QUEENSLAND (2013)

Undertook hydraulic and geomorphic characterisation of Blackwater Creek and assessed the impact of mine subsidence. **Blackwater Coal Pty Ltd**

MORANBAH SOUTH GEOMORPHIC ASSESSMENT AND MINE SUBSIDENCE IMPACT STUDY QUEENSLAND (2013)

Undertook hydraulic and geomorphic characterisation of the Isaac River, Grosvenor Creek and Cherwell Creek across the Moranbah South Project near Moranbah. Assessed the impact of mine subsidence on the watercourses. **Anglo American Metallurgical Coal Pty Ltd**

CARBINE CREEK AND CRYSTAL CREEK DIVERSION FEASIBILITY STUDY, QUEENSLAND (2012)

Developed concept design options for the diversion of Carbine and Crystal creeks for the proposed Valeria Project. **Rio Tinto Coal Australia Pty Ltd**

THIRTEEN MILE GULLY DIVERSION CONCEPT DESIGN QUEENSLAND (2012)

Developed concept design of a stream diversion of Thirteen Mile Gully for the Middlemount Coal mine. **Middlemount Coal Pty Ltd**

ROPER CREEK STREAM DIVERSION STUDY QUEENSLAND (2010)

Developed concept design of a stream diversion of Roper Creek for the Middlemount coal mine. **Middlemount Coal Pty Ltd**

DARETON QUARRY EXPANSION HYDRAULIC GEOMORPHIC ASSESSMENT, NEW SOUTH WALES (2010)

Assessed the potential changes in the hydraulic and geomorphic characteristics of the Murray River due to the proposed extension of a sand dredge. **Boral Pty Ltd**

BETTYS CREEK STREAM DIVERSION STUDY NEW SOUTH WALES (2009)

Used natural channel design principles to develop a concept design of a stream diversion of Bettys Creek, a tributary of the Hunter River, for a proposal to that involved longwall mining lowering ground levels by up to 4.5m. Changes in stream power and shear stresses, estimated using a hydraulic model, were used to define potential erosion problem areas. The concept design was submitted as part of the Barrett and Hebden Seam longwall mining EIS. **Integra Coal**

CONROCK GULLY DIVERSION CONCEPT DESIGN, MORANBAH QUEENSLAND (2008)

Developed a concept design of a stream diversion of Conrock Gully, a minor tributary of the Isaac River, using natural channel design principles. The changes in stream power and shear stresses, estimated using a hydraulic model, were used to define potential erosion problem areas. The concept design was submitted as part of the Isaac Plains Expansion EIS. **Isaac Plains Coal**

SOUTH PINE RIVER EROSION AND STABILITY ASSESSMENT, DRAPER, QUEENSLAND (2006)

Assessed the stability of a section of the South Pine River using geomorphic principles to determine the appropriate set-back distance for a proposed development. **Oakwood Australia**

BETTYS CREEK GEOMORPHIC ASSESSMENT AND MINE SUBSIDENCE STUDY, NEW SOUTH WALES (2006)

Assessed erosion potential along Bettys Creek, a tributary of the Hunter River, for a proposal that involved longwall mining lowering ground levels by up to 1.5 m. The changes in stream power and shear stresses, estimated using a hydraulic model, were used to define potential erosion problem areas. Erosion protection measures were designed using natural channel design principles. **Glennies Creek Colliery**

KOGAN CREEK/EASTERN BRANCH CREEK DIVERSION QUEENSLAND (2006)

Developed a detailed design of the Eastern Branch Creek diversion around the proposed Kogan Creek Coal Mine. The hydraulic and geomorphic characteristics of the existing creek were used as the template to design the new diversion. Highly dispersive soils in the area meant that velocities and shear forces could not be increased. A 2D model of the area was developed. **CS Energy**

OXLEY CREEK TRIBUTARY, WATERWAY ENHANCEMENT STRATEGY, INALA QUEENSLAND (2007)

Developed short-, medium- and long-term waterway enhancement strategies, including a construction program for the Oxley Creek tributary in Len Walters Place in Inala, to control severe bed erosion and subsequent bank erosion at the site. **Brisbane City Council**

SPRINGFIELD UNIVERSITY GULLY DIVERSION, SPRINGFIELD QUEENSLAND (2005)

Developed conceptual designs of two gully diversions around the proposed Springfield southern sportsfield and university site, including one diversion that consisted of a 7 m-high drop structure into Mountain Creek. The other consisted of the construction of a natural channel with a pool and riffle sequence. **Springfield Land Corporation**

SOUTH PINE RIVER EROSION AND STABILITY ASSESSMENT, EATONS HILL QUEENSLAND (2005)

Assessed the stability of a section of the South Pine River to determine the appropriate set-back distance for a proposed residential development. The site suffered significant erosion damage following the 1974 flood but a successful rehabilitation program arrested much of the erosion. **Pine Rivers Shire Council**

ONE MILE CREEK, EROSION PROTECTION WORKS, JOYNER QUEENSLAND (2004)

Investigated the causes of erosion along a reach of One Mile Creek adjacent to the North Pine River. Several options to repair the site and a detailed design of the preferred design were developed for a riverine permit protection application. The works were supervised to ensure that correct construction techniques were followed. **Pine Rivers Shire Council**

MARYLYN BOXER RESERVE STORMWATER OUTFALL DESIGN, JOYNER QUEENSLAND (2004)

Developed the design of an 8 m-high, 100 m-long stormwater outfall using natural channel design principles. Provided advice on sediment and erosion control during construction and construction management. **Davbridge Constructions and Pine Rivers Shire Council**

REVIEW OF BANK PROTECTION WORKS, TIEN GIANG AT MY THUAN VIETNAM (2001)

Assessed the structural integrity of a 250 m-long permeable groyne field constructed on the Tien Giang (Mekong River) at My Thuan to prevent bank erosion. Deep soft sediments were found on the riverbed during the construction phase of the project, which had not been identified during the design phase. Remedial actions were taken to stabilise the soft sediments to prevent the groynes from washing away. Available geomorphic and sediment data was reviewed to determine whether the potential for deep scour could have been predicted and whether the remedial actions were adequate to prevent the groynes from failing. **Maunsell Macintyre and AusAID**

SPRINGFIELD TOWN CENTRE CREEK DIVERSION QUEENSLAND (2001)

Developed a conceptual design of a major creek diversion around the proposed Springfield Town Centre. The diversion drain consisted of a large flood-retention structure at the upstream end and a series of ponds linked by drop structures. Peak velocities and flood levels were determined for a range of design storms up to the probable maximum flood. **Springfield Development Corporation**

LOCKYER CREEK BANK EROSION STUDY, HELIDON QUEENSLAND (2001)

Extensive bank erosion of Lockyer Creek at Helidon was encroaching on 6 residents' properties. Undertook hydraulic and geomorphic assessment of the creek to determine the causes of erosion. Undertook geotechnical investigations to assess the stability of the existing bank. Social and environmental implications and cost of several options were assessed to provide the most appropriate solution for the affected residents. **Gatton Shire Council**

MULLERING BROOK DIVERSION, CATABY WESTERN AUSTRALIA (2001)

Developed a rehabilitation plan for Mullering Brook across the TIWEST mineral sand mine. A temporary diversion was constructed during mining, which was not consistent with natural channel design principles. A new channel was designed that was consistent with other watercourses in the area. **TIWEST**

CREEK DIVERSION STUDY, 14 AREA DAM, MOURA MINE QUEENSLAND (2000)

Developed a conceptual design of a creek diversion around 14 Area Dam at Moura Mine. A second drain was designed to capture 'dirty' runoff before it entered the creek and divert it to the dam. Hydrologic models of the creek and dirty water catchments were developed to estimate design discharges. The HEC-RAS hydraulic model was used to estimate peak water levels, velocities and shear stresses to estimate the potential for bed erosion in the proposed diversion drains. A system of drop structures and a flatter drain shape were recommended to reduce erosion. **Moura Mine**

STREAM DIVERSION STUDY WEEAN SAPPHIRE MINE, INVERELL NEW SOUTH WALES (2000)

Provided advice on the hydraulic and geomorphic aspects of a creek diversion and sediment and erosion control measures for the Weean Open Cut Sapphire Mine Extension. **GTN Resources**

RIVER DIVERSION STUDY, TOKA TINDUNG, MANADO, NORTH SULAWESI, INDONESIA (1999)

Developed options and prepared conceptual designs for the proposed diversion of the Koba River around a proposed open-cut copper/gold mine. The conceptual design and proposed erosion control works were designed using hydraulic and geomorphic principles to ensure long-term viability of the diversion. Assessed the environmental and social impacts of each option. **Aurora Gold**

UPPER BRISBANE RIVER SAND AND GRAVEL EXTRACTION STUDY QUEENSLAND (1998)

Investigated the feasibility of establishing a sand and gravel quarry on the Brisbane River floodplain upstream of Wivenhoe Dam. Estimated the sediment-carrying capacity of the stream at the proposed location using empirical equations and determined the quantity of sediment that could be removed without causing downstream erosion. **Karreman Quarries**

14 AREA DAM BYWASH EROSION CONTROL DESIGN, MOURA MINE QUEENSLAND (1998)

Developed a design of 2 bed-control drop structures in the 14A Dam bywash channel at Moura Mine using the 'keyed-in' boulder technique. The construction of the drop structures was supervised to ensure quality control. **Moura Mine**

SILVERTON CREEK DIVERSION EROSION CONTROL STUDIES QUEENSLAND (1998)

Assessed options to address the current erosion and sedimentation problems along the Silverton Creek diversion channel at Moura Mine. Designed remedial measures to capture excess sediment at the site. **Moura Mine**

CREEK DIVERSION STUDY, QUIX PROJECT, RICHLANDS QUEENSLAND (1997)

Developed a concept design of a creek diversion around a proposed Quix Service Centre at Richlands. Designed erosion control measures such as revegetation and bed control structures for the site. Developed a HEC-RAS hydraulic model to determine post-construction velocities and scour potential. The construction of the diversion channel and bed control structures was supervised to ensure quality control. **Mobil Australia**

BRUSH FARM PARK STORMWATER OUTFALL DESIGN, RYDE NEW SOUTH WALES (1996)

Developed a design for a rock-lined stormwater outfall in Brush Farm Park using the keyed in 'rock boulder technique'. **Ryde City Council**

TUMUT AND UPPER MURRAY RIVER EROSION MANAGEMENT WORKS, NEW SOUTH WALES & VICTORIA (1994–1996)

Project managed Tumut and Upper Murray River Erosion Control Management Works. Tasks included:

- developing a yearly program for erosion control and river maintenance work valued at \$1,130,000 per year;
- reporting quarterly on progress of work and costs;
- designing all bank and bed control works over a 72 km reach of the Tumut River and an 84 km reach of the Upper Murray River using hydraulic, geomorphic and fluvial principles;
- supervising an overseer and two works crews, improving efficiency in field operations, and developing a safety policy;
- drawing up and calling tenders for the supply of contract trucks, excavators and bulldozers for the works, and assisting in supervision of contracts;
- managing three hard-rock quarries to supply rock for bank protection, calling lump sum tenders to drill and blast, supervising contracts, supervising stripping of overburden, and establishing benches for safe and economical loading of blasted rock;
- developing a replacement strategy for mechanical plant, and preparing and calling tenders for the supply of bogie drive trucks and backhoes;
- liaising and promoting the works to regional directors, Ministers and landholders; and
- establishing the Tumut River Landowners Association to improve communication between the Department and the community.

Murrumbidgee Irrigation and SMHEA

ISLAND CREEK WILLOW REMOVAL PROGRAM, CONDOBOLIN, NEW SOUTH WALES (1996)

Establish and supervise a program of works to remove willows along Island Creek near Condobolin. **NSW Department of Water Resources**

YANCO, COLOMBO AND BILLABONG CREEKS WILLOW REMOVAL PROGRAM, NEW SOUTH WALES (1995)

Established and supervised a program of works to remove willows along Yanco, Colombo and Billabong Creeks. **NSW Department of Water Resources**

HYDRAULIC GEOMORPHIC ASSESSMENT OF THE TUMUT RIVER, NEW SOUTH WALES (1995)

Helped to develop a detailed hydraulic geomorphic assessment of the Tumut River to improve the design of erosion control works and apportion costs between electricity and irrigation interests. **NSW Department of Water Resources**

TUMUT RIVER MANAGEMENT STRATEGY NEW SOUTH WALES (1995)

Helped to develop a five-year funding management strategy for the Tumut River erosion control works. The strategy included:

- developing a strategy to reduce bank erosion in the five years to recurrent erosion rates;
- developing a willow-management strategy to increase channel capacity and reduce erosion;
- developing a snag management strategy to improve fish habitat and reduce erosion;
- developing an anabranch strategy to maintain flow distribution and reduce overbank flooding;
- costing all works for the five-year program and apportioning costs; and
- promoting the strategy to the community and irrigation and electricity interests.

NSW Department of Water Resources

TUMUT RIVER CAPACITY INVESTIGATIONS NEW SOUTH WALES (1995)

Developed a program to monitor high flows released in the Tumut River during the 1994–95 drought. Used monitoring information to develop maximum release rules from Blowering Dam to maximise flow and minimise overbank flow and groundwater flooding.

Murrumbidgee Irrigation

EASTERN CREEK RACEWAY DRAINAGE DESIGN, EASTERN CREEK, NEW SOUTH WALES (1994)

Helped to design and construct 13 rock and timber bed-control structures to control bed erosion in the Eastern Creek Raceway drain.

Eastern Creek Raceway

EROSION CONTROL WORKS, BELL RIVER, WELLINGTON NEW SOUTH WALES (1994)

Helped to design and construct three large Shauberger Ramps (bed-control structures) to control bed erosion in the Bell River near Wellington. **NSW Department of Water Resources**

Water resources planning studies

GLEBE WEIR RAISE REVIEW OF ENVIRONMENTAL FACTORS QUEENSLAND (2008)

Glebe Weir, located on the Dawson River, was to be raised to supply high-security water to the proposed Wandoan coal mine. Assessed and presented the impacts of the raise on the environment and the existing users of Dawson River flows in a review of environmental factors. **Sunwater**

ASSESSMENT OF OPTIONS TO RAISE MT CROSBY WEIR, BRISBANE RIVER QUEENSLAND (2007)

Mount Crosby Weir is the primary raw-water balancing pool that supplies water to south-east Queensland. Developed concept designs of several weir-raising options. Assessed the impact of the various raising options on historical no-failure yield, environmental flow objectives and flood levels along the Brisbane River. **Brisbane Water**

WYARALONG DAM ENVIRONMENTAL IMPACT STUDY QUEENSLAND (2007)

Helped to prepare Wyaralong Dam EIS in the role of Hydrology and Hydraulics Technical Specialist. **Queensland Water Infrastructure**

EAST COAST WATER INITIATIVE CONCEPT STUDY, NEW SOUTH WALES / QUEENSLAND (2006)

Developed concept design for a dam on the Mann River, a major tributary of the Clarence River, to supply 150,000 ML/year of bulk water to south-east Queensland. Undertook hydrological modelling of the dam to determine the reliability of supply and the impact on downstream flows. Developed a concept plan of a pipeline to deliver the water. Determined the costs and environmental impacts of the scheme. **JPM Consultants Pty Ltd**

DERMARK FARMS BURNETT RIVER LICENCE TRANSFER APPLICATION, QUEENSLAND (2005–2006)

Provided advice and assisted with the negotiations to change the location of a water licence on the Burnett River. A Section 130 application under the Water Act was necessary because the application was not consistent with the Burnett ROP. This was the first Section 130 application assessed under the Water Act in Queensland. **Dermark Farms**

YUELAMU TOWNSHIP WATER SUPPLY INVESTIGATION NORTHERN TERRITORY (2004)

Developed options to improve the reliability of supplying potable water to the Yuelamu Aboriginal community. A daily rainfall runoff model and IQQM water balance model were developed to optimise an existing dam and determine its long-term reliability. Strategies were developed to improve catchment management and water quality of the existing dam. **PowerWater Corporation**

OPTIMISATION TOOL FOR WIVENHOE DAM RELEASES, BRISBANE QUEENSLAND (2004)

Developed a model to determine optimum releases from Wivenhoe Dam for Brisbane City's water supply extractions at Mt. Crosby Weir. **South East Queensland Water**

LOWER WEIR RIVER WATER LICENCE TRANSFER APPLICATION ADVICE, QUEENSLAND (2003)

Provided advice to Reardon Farms on the potential loss of allocation of overflows from the MacIntyre River. Reviewed Weir River licence conditions and analysed the water level discharge from their pumping pool. **Reardon Farms**

WIVENHOE DAM YIELD ASSESSMENT SCENARIO MODELLING QUEENSLAND (2003)

Used Brisbane River IQQM model to assess the impact of various spillway augmentation options for Wivenhoe Dam on the available yield at Mt Crosby Weir for the Greater Brisbane and Ipswich areas. **Wivenhoe Alliance/Seqwater**

DAM SAFETY AUDITS QUEENSLAND (2003-2004)

Completed preliminary failure impact assessments of 23 dams across Queensland. **Department of Natural Resources and Mines, Queensland.**

GWYDIR REGULATED RIVER IQQM REVIEW NEW SOUTH WALES, (2002)

Peer reviewed input data used by the NSW Department of Land and Water Conservation to develop the Gwydir Regulated River Integrated Quantity Quality Model (IQQM). The model was used as a planning tool to assess the impact of various catchment-wide management options. **NSW Department of Land and Water Conservation**

LACHLAN REGULATED RIVER IQQM ADVICE NEW SOUTH WALES, (2002)

Provided advice to Lachlan Valley irrigators on the impact of various management options assessed by the NSW Department of Land and Water Conservation using the Integrated Quantity Quality Model (IQQM) to restrict irrigation growth in the valley. **Lachlan Valley Water**

LAKE JINDABYNE ENVIRONMENTAL RELEASE AUDIT NEW SOUTH WALES (2001)

Peer reviewed Snowy Hydro's water balance model of the Snowy Mountains Hydroelectric Scheme to ensure all environmental objectives outlined in the Draft Snowy Water Licence were being achieved. **Victorian Department of Natural Resources and Environment**

CAGAYAN SPECIAL ECONOMIC ZONE WATER SUPPLY REVIEW PHILIPPINES (2001)

Reviewed the proposal to supply water to the Cagayan Special Economic Zone through a run-of-river water supply scheme. The review involved assessing available rainfall and stream flow data and investigating the water requirements of the proposed development, existing irrigators and the environment. **Cardno MBK**

BORDER RIVERS WATER IN THE MURRAY DARLING SYSTEM, QUEENSLAND / NEW SOUTH WALES (2001)

Collated hydrologic data from various authorities to assess the impact of Border Rivers inflows and abstractions on water availability downstream. Prepared a water balance summary for a number of reaches from Mungindi downstream to the mouth of the River Murray. **Border Rivers Food & Fibre**

ANCHORAGE FARMS LICENCE AMALGAMATION STUDY, ST GEORGE, QUEENSLAND (2001)

Investigated the impact of amalgamating two licences on extractions from the Lower Balonne River. Also reviewed water balance models of two farm management plans. The results were presented at a court hearing objecting to the application. **Anchorage Farms**

CORISH FARMS PUMP RELOCATION INVESTIGATION, TALWOOD QUEENSLAND (2001)

DNRM imposed significant pumping restrictions on Corish Farms for moving their water harvesting pump site on the lower Weir River further upstream. An IQQM water balance model of the Lower Weir River was developed to assess the impact of moving the water-harvesting pump site on other water harvesters. The model was used to assist Corish Farm's appeal against the restrictions. **Fox and Thomas**

NELSONS CREEK WATER LICENCE APPLICATION NEW SOUTH WALES (2000)

Objections were received to the licensing of a pump on Nelsons Creek for Timbarra Mine. A daily rainfall runoff Sacramento model and a daily behavioural model (IQQM) were developed and calibrated for Nelsons Creek at the pump site to assess the impacts of the pumping regime on downstream flows. The findings of the study were defended in a Land and Environment Court hearing on the matter. **Phillips Fox Lawyers**

CLARENCE RIVER DIVERSION INVESTIGATION NEW SOUTH WALES (2000)

Developed daily water balance models (IQQM) of the Clarence River catchment in northern New South Wales to assess the impact of various scenarios to divert water westward into the Dumaresq River for irrigation. Completed a detailed assessment of the hydrological and environmental impacts both downstream of the dam and along the Dumaresq and Border Rivers. **National Water Initiative**

BELYANDO SUTTOR RIVERS IQQM STUDY QUEENSLAND (1999)

Developed and calibrated Sacramento rainfall runoff models at seven locations within the Belyando and Suttro River catchments for use in the development of an IQQM model. Adjusted recorded streamflows for historical irrigation abstractions. Used calibrated models to extend the 20-year period of recorded flow data to the 100-year period of available rainfall data. **Queensland Department of Natural Resources**

CITY OF CORNWALL WATER SUPPLY STUDY CANADA (1991)

Developed and calibrated a hydraulic model of the Cornwall (Canada) water supply system using 'Kentucky Pipe' software. The model was used to develop a pipe-replacement program and to design the height of a water tank. **Cornwall City Council**

COOMEALLA IRRIGATION AREA WATER SUPPLY STUDY NEW SOUTH WALES (1990)

Estimated the optimum size of pumps and pipes to extract water from the Murray River for the Coomealla Irrigation Area. The 'Pipes 3.04' hydraulic software was used. **Coomealla Irrigation Area**

DAM MONITORING NEW SOUTH WALES (1990)

Collected data to monitor the integrity of dams throughout New South Wales. **NSW Department of Water Resources**

RIVER OPERATIONS NEW SOUTH WALES (1990)

Managed releases from New South Wales dams to supply irrigation areas and downstream environmental flows. **NSW Department of Water Resources**

FIELD HYDROGRAPHER NEW SOUTH WALES (1989)

Helped to gather flow and water-quality data on streams and rivers in New South Wales. Undertook an extensive study of the high-flow gauging anomalies at Forbes, New South Wales. **NSW Department of Water Resources**

Publications

Conference papers and technical presentations

Roads, G. (2007) 'Flood Hydrology — Crystal Ball Gazing or Science' Keynote presentation made at the AICLA and ANZIIF Claims Convention, Sydney 2007.

Maher, B., Roads, G. (2004) 'Wivenhoe Dam Upgrade — Adopted Strategy and Downstream Impacts' Paper accepted for presentation at the 8th National Conference on Hydraulics in Water Engineering, Gold Coast, Australia, July 2004

Ahmed-Zeki, A., Roads, G. (2003) 'Option Investigation and Design Approach — On the Wivenhoe Dam Spillway Augmentation' Paper published at the 43rd Annual Australian National Committee on Large Dams (ANCOLD) Conference, Hobart, Australia, October 2003.

Chandler, K, Gill, D, Macnish, S., Maher, B., Roads, G. (2003) 'Coping with the Probable Maximum Flood — An Alliance Project Delivery for Wivenhoe Dam' Paper accepted for presentation at the 43rd Annual Australian National Committee on Large Dams (ANCOLD) Conference, Hobart, Australia, October 2003.

Enclosure 3

Noel Merrick Curriculum Vitae

Noel Merrick

Senior Principal Hydrogeologist

Qualifications

PhD (Groundwater Management)	University of Technology, Sydney	2000
GradDip (Data Processing)	New South Wales Institute of Technology	1980
MSc – research (Geophysics)	University of Sydney	1977
BSc	University of Sydney	1971

Biography

Noel is a groundwater modeller, hydrogeologist and geophysicist with 50 years of experience in groundwater science. He retired in May 2009 from the University of Technology, Sydney, where he was Associate Professor and Director of the National Centre for Groundwater Management. He ran courses in Groundwater Modelling, Groundwater Geophysics and Groundwater Policy and Management. As a researcher, he pioneered methods for resource sustainability quantification and management, particularly using optimisation techniques, and has been engaged in research projects with the Aquaculture, Rice, Cotton and Contaminant CRCs. He was a member of the NSW working group that drafted the State Groundwater Policy documents and advised the Office of Water on prescriptive elements of the Aquifer Interference Policy (2012). In November 2019, he was awarded the inaugural Groundwater Professional Award by IAH Australia, for lifetime achievement in hydrogeology for services to education, research and industry.

Noel has participated on a number of expert panels as the water expert for the NSW government. He regularly reviews groundwater resource models for Commonwealth and state government departments. He has also been a long-time member of the Murray-Darling Basin Independent Audit Group – Salinity, covering the ACT and the basin States.

Currently, he is a member of Technical Advisory Panel for the Office of Groundwater Impact Assessment (Queensland). He has presented expert witness testimony at several court cases in NSW, Queensland and New Zealand. Having authored the peer review section of MDBC groundwater flow modelling guidelines, he has been heavily involved in peer reviewing groundwater modelling studies in NSW, Victoria, Western Australia and Queensland.

Professional history

Director, Senior Principal	Heritage Computing Pty Ltd	2020-
Technical Director	SLR Consulting Australia	2019-2020
Director, Senior Principal	NPM Technical Pty Ltd t/a HydroSimulations	2016-2019
Director, Senior Principal	HydroAlgorithmics Pty Ltd	2013-2019
Director, Senior Principal	Heritage Computing Pty Ltd t/a HydroSimulations	2010-2016
Director, Senior Principal	Heritage Computing	1980-2010
Associate Professor	University of Technology, Sydney	2005-2009
Acting Director	National Centre for Groundwater Management, UTS	2004-2008
Research Scientist	UTS Institute for Water and Environmental Research Management	2001-2008
Senior Lecturer	Groundwater Modelling and Geophysics, UTS	1992-2005
Lecturer / Senior Lecturer	University of N.S.W.	1987-1992
Senior Hydrogeologist	Department of Water Resources, N.S.W	1987
Geophysicist /Hydrogeologist	Water Resources Commission, N.S.W	1972-1986

Suitably qualified expert

- ❑ Federal Department of the Environment: Foxleigh Mine Groundwater Monitoring Plan
- ❑ NSW Department of Planning & Environment: Wilpinjong Coal Surface and Ground Water Response Plan
- ❑ Department of Planning & Environment: Metropolitan Mine LW20-22 , LW23-27, LW301-303 Extraction Plans

- ❑ NSW Department of Planning & Environment: Duralie and Stratford Coal Mine Groundwater Management Plans.

Mining projects

- ❑ Development of longwall coal models: South Galilee and Galilee (Qld); Metropolitan, Bulli Seam Operations, Dendrobium and Tahmoor (Southern Coalfield); Ulan and Wilpinjong (Western Coalfield); Narrabri and Caroona (Gunnedah Coalfield); Wambo, Spur Hill and Doyles Ck (Hunter Coalfield) (NSW).
- ❑ Development of open cut models: Duralie and Stratford (Gloucester); Tarrawonga and Vickery (Gunnedah).
- ❑ Development of density-coupled solute model for lithium mine (Argentina).
- ❑ Peer reviews of numerous mining models: e.g. Carmichael (Galilee, Qld), Clermont Qld, Kestrel Gregory Crinum Qld, Coppabella Qld, Latrobe Vic, Phulbari (Bangladesh), Bickham, Abel, Moolarben, Wilpinjong, Boggabri, Ulan, Dendrobium, Ashton, Narrabri, Maules Creek, Caroona, Watermark, Mt Owen, Liddell, Drayton South, West Wallsend, Neubeck, Mandalong, Werris Ck, Airly, United, Gloucester Gas Project, Brandy Hill, Bylong, United (all NSW), etc.

Quarrying projects

- ❑ Membership of the IHAP Panel for the Somersby Fields Project (sand quarry).
- ❑ Development of a groundwater model for Calga Sand Quarry.
- ❑ Expert witness at the NSW Land and Environment Court: Rocla's Calga Sand Quarry.
- ❑ Expert witness at the Qld Land Court: East End Mine.
- ❑ Peer review of groundwater assessments: Central Coast Sands Quarry, Somersby; Brandy Hill Quarry, Raymond Terrace; Balranald mineral sands; Hawsons iron.

Water Resource Investigations

- ❑ Development of finite element groundwater flow model: Port Botany reclamation; Sydney Airport Third Runway; Eastern Distributor & Airport Link tunnels (Sydney).
- ❑ Development of regional water resource models: Lower Namoi, Mooki, Botany Sands, Buronga (all NSW).
- ❑ Development of solute transport models: Buronga, Helensburgh.
- ❑ Peer reviews of numerous models and groundwater investigations:
 - infrastructure (Badgery's Creek airport, Epping-Chatswood Rail Link),
 - water supply: Parkes-Forbes, Upper Namoi, Murrumbidgee, Upper Nepean (NSW); Perth, Pilbara, Albany (WA); Bribie Island, North Stradbroke Island, Pioneer (Qld); Adelaide Plains (SA); Corangamite, Loddon, Campaspe, Anglesea (Vic); Murray-Darling Basin (3 states); Canterbury (NZ); Baruun Naran (Mongolia),
 - sewage (Gerringong; Cronulla) and waste (Castlereagh),
 - contamination (Botany; Mascot; Homebush; Pasminco & Incitec Newcastle),
 - irrigation (Swagman-Farm software; Coleambally NSW; Werribee Vic) and salinity (Padthaway SA, Eastern Mallee NSW/Vic),
 - seawater intrusion (Pioneer Qld; Uley SA; Albany WA), swamps (Newnes NSW).

Environmental Impact Assessment

- ❑ Preparation of groundwater assessments: Baralaba, Galilee and South Galilee (Qld); Metropolitan, Bulli Seam Operations, Tahmoor, Duralie, Stratford, Tarrawonga, Wambo, Wilpinjong, Vickery, Caroona, Spur Hill (NSW);
- ❑ Development of water level and water quality triggers for groundwater management plans: Metropolitan Mine NSW; Duralie NSW; Stratford NSW; Springvale NSW; Angus Place NSW. Peer review: Foxleigh, Qld.

Contaminated Site Assessment

- ❑ Development of groundwater contamination models: Botany Sands (Orica); Boolaroo (Pasminco); Boolaroo (Incitec); Sydney Domestic Airport; Mt Piper (Delta Electricity); Blenheim (NZ).

Professional Training

- ❑ Supervision of 20 PhD research projects;
- ❑ Supervision of 72 Masters research projects;
- ❑ Presenter, specialist introductory and advanced modelling short courses from 1997;
- ❑ Chairman and presenter, "Water in Coal Mining" schools 2011 (Brisbane), 2012 (Newcastle), 2013 (Adelaide).
- ❑ Academic lecturer from 1987 to 2009;
- ❑ Presenter, National Groundwater Schools (1975+);

Publications / conference papers

- ❑ Keynote Speaker at seven conferences (four international);
- ❑ Over 500 report and journal publications.

Enclosure 4

Dr Colin Driscoll Curriculum Vitae

Contact Details

PO Box 59
Wangi Wangi NSW 2267

Mobile 0438 773029
Email cd_enviro@bigpond.com

Qualifications

BSc (Lond)
PhD (Newcastle) "*The ecology of reproduction and propagation in a rare plant, Tetratheca juncea.*"

Plant Sciences Group
School of Environmental and Life Sciences
University of Newcastle Australia

Employment History

Mar 2007 – current	Independent environmental consultant trading as HUNTER ECO.
Jan 2001 – Mar 2007:	Senior Environmental Biologist with EcoBiological.
1983 – 2000	Part-time environmental consultant.
1977 – 1983	Environmental assessments for the Electricity Commission of NSW through TUNRA along with work towards MSc (Newcastle).
1976 – 1977	Commenced working towards MSc (Biology, Newcastle) Topic: The reproductive biology and ecology of the Sugar Glider (<i>Petaurus breviceps</i>).
1967 – 1975	Researcher and Deputy Director Australasian Food Research Laboratories (a division of Sanitarium).

Professional Associations

Australian Network for Plant Conservation

Licenses

NPWS Scientific Licence SL101245
NSW Biobanking Assessor 0011
NSW BAM Assessor Accreditation BAAS17004 valid to 06/2025

Affiliation

The University of Queensland
School of Agriculture and Food Sciences
Adjunct Associate Professor

ECOLOGY & BIOLOGY

Primary areas of expertise are in the fields of botany and vegetation ecology although I did start my career as a fauna person so have a good knowledge of birds and mammals and a fair knowledge of amphibians and reptiles. Current and past projects and research involve the following:

- Vegetation community classification and mapping
- Threatened flora species monitoring
- Translocation of threatened plant species
- Population density assessment of rare plants
- Rare plant breeding systems
- Pollinator-plant interactions
- Rare plant habitat suitability modelling
- Groundwater Dependent Ecosystems
- Distribution and function of biological soil crusts across Australia's north

TARGETED THREATENED PLANT POPULATION COUNTS

Targeted population counts have been conducted for the following threatened species:

- *Acacia bynoeana*
- *Angophora inopina*
- *Cymbidium canaliculatum*
- *Diuris tricolor*
- *Grevillea parviflora* subsp. *parviflora*
- *Hibbertia procumbens*
- *Melaleuca biconvexa*
- *Ozothamnus tessellatus*
- *Pomaderris queenslandica*
- *Rutidosia heterogama*
- *Senecio spathulata*
- *Tetratheca juncea*
- *Tylophora linearis*

GIS & DATA ANALYSIS

In association with the ecological consultancy and research work, a comprehensive range of skills has been acquired in spatial data management, analysis and presentation using various Geographical Information Systems (GIS), along with other analytical tools. Main programs used are Manifold System GIS, Surfer, SAGA GIS, QGIS, Global Mapper, Primer 7+PERMANOVA, Minitab 19 and several vector and raster handling programs. Capabilities include:

- Georeferencing of aerial images
- Development of digital terrain models
- Visual fields analysis
- Hydrology
- Topography
- Landform analysis
- Lidar data manipulation
- Spatial data management and analysis
- Presentation maps
- Similarity analysis
- Statistical analysis

LEGISLATION

Familiar with the relevant requirements of the following:

Commonwealth

Environment Protection & Biodiversity Conservation Act 1999

Environment Protection and Biodiversity Conservation Regulations 2000

JAMBA, CAMBA & RoKAMBA migratory bird agreements

NSW

Environmental Planning and Assessment Act 1979

Environmental Planning and Assessment Amendment (Biodiversity Conservation) Regulation 2017

National Parks and Wildlife Act 1974

Biodiversity Conservation Act 2016

Biodiversity Conservation Regulation 2017

Biodiversity Assessment Method Order 2020

Water Management Act 2000

Relevant State Environment Planning Policies.

Local Government requirements.

Projects

The following describe the range of work conducted:

- Review of Environmental Factors
- Preparation of Biodiversity Development Assessment Reports and Biodiversity Stewardship Assessment Reports
- Ecological constraints assessment
- Threatened species assessment
- Groundwater Dependent Ecosystems assessment
- Preparation of ecological management and monitoring plans
- Implementation of ecological management and monitoring plans
- Targeted threatened plant surveys, population counts and density assessments
- Threatened plant habitat suitability modelling
- Translocation of threatened plants
- Approved by NSW Department of Planning as an independent specialist auditor of mining ecological management and monitoring programmes

Clients include:

- Extractive industries such as mining and quarrying
- Resource exploration companies
- Local, State (NSW) and Commonwealth Government

Major clients:

- BHP (Mount Arthur and Carroona)
- The Bloomfield Group
- Centennial Coal (Awaba, Cooranbong, Myuna, Mandalong, Newstan)
- Cockatoo Coal (Bylong Valley exploration)
- Peabody Energy (Wilpinjong¹ and Wambo)
- MACH Energy (Mt Pleasant)
- Malabar Coal (Maxwell)
- Whitehaven Coal (Maules Creek², Narrabri, Tarrawonga and Vickery)
- Yancoal (Abel, Ashton, Donaldson, Moolarben and Tasman)
- Glencore (Mangoola)
- Newcrest Mining
- Regis Resources (McPhillamys Gold Project)
- CleanTEQ
- Newcastle Coal Infrastructure Group
- Lake Macquarie City Council

¹ Preparation of the Wilpinjong Coal rehabilitation strategy.

² Preparation of the Whitehaven Coal Threatened Flora Project Plan and peer review of the Biodiversity Management Plan.

- NSW Department of Planning and the Environment

Independent Biodiversity Auditor

Biodiversity component within: Independent Environmental Audit – NCIG Export Coal Loader Kooragang Island January 2014 & January 2015 Report prepared by: Trevor Brown & Associates Applied Environmental Management Consultants 3 Forwood Crescent Bundanoon NSW 2578

Peer Reviews

Peer review of annual monitoring reports; Biodiversity Management Plans; Biodiversity Assessment Reports and Biodiversity Offset Strategies; Biodiversity Development Assessment Reports and Biodiversity Stewardship Site Assessment Reports.

NSW Land & Environment Court (expert witness)

DCR Property Consultants -v- Great Lakes Council Land & Environment Court Proceedings No. 10263 of 2003. Premises: Lot 474, DP95462, Parish of Carrington.

ProTen Karuah Limited ats The Karuah Action Group. Land and Environment Court Proceedings No 10653 of 2004.

Geographic Area

The majority of my work is in Central and Eastern New South Wales with research projects also conducted across Queensland and the Northern Territory.

Academic

The University of Newcastle, Australia, honours students

A. T. Blundell (2003) *The Powerful Owl* (*Ninox strenua*) in *Disturbed Environments*.

D. Landenberger (2003) *Defining the Niche of Tetratheca juncea*.

A. Jones (2011) *Conservation genetics and its application to the threatened native shrub Tetratheca juncea*.

The University of Queensland, St Lucia, research

Team member (2019 -) *Boosting natural regeneration of nitrogen in grazing lands*.

Reports

- Driscoll, C. (2006) *Acacia bynoeana: a review of species information*. Unpublished Report prepared for the Department of Environment and Conservation, Newcastle. EcoBiological. June 2006.
- Driscoll, C. (2009) *A review of the ecology and biology of Tetratheca juncea Sm. (Elaeocarpaceae)*. Prepared for Lake Macquarie City Council. November 2009.
- Driscoll, C. (2013) *The ecology of Grevillea Parviflora subsp. parviflora, a review*. Report prepared for Lake Macquarie City Council March 2013.
- Driscoll, C. & Bell, S.A.J. (2008) *The Experimental Translocation of Tetratheca juncea Sm. (Elaeocarpaceae) at Gwandalan, Wyong Shire*. Report to Crighton Properties Pty Ltd, Wyong Shire Council, NSW Department of Environment & Climate Change. December 2008.

Peer-reviewed

- Bell, S.A.J. & Driscoll, C. (2005) New records for the endangered *Hibbertia procumbens* from the Central Coast of NSW. *Australasian Plant Conservation* 13(4): 24-25.
- Bell, S.A.J. & Driscoll, C. (2006) Vegetation of the Tomago and Anna Bay Sandbeds, Port Stephens, New South Wales: Management of Ground Water Dependent Ecosystems. Part 1 – Vegetation Classification. Unpublished Report to Hunter Water. Eastcoast Flora Survey. August 2006.
- Bell, S.A.J. & Driscoll, C. (2007) Vegetation of the Cessnock-Kurri Region, Cessnock LGA, New South Wales: Survey, Classification & Mapping. Unpublished Report to Department of Environment & Climate Change. Eastcoast Flora Survey. November 2007.
- Bell, S.A.J. & Driscoll, C. (2014) *Acacia pendula* (Weeping Myall) in the Hunter Valley of New South Wales: early explorers' journals, database records and habitat assessments raise doubts over naturally occurring populations. *Cunninghamia* 14: (2014) 179–200
- Bell, S.A.J. & Driscoll, C. (2016) Hunter Valley Weeping Myall Woodland – is it really definable and defensible with and without Weeping Myall (*Acacia pendula*)? *Cunninghamia* 16: 15-30.
- Bell, S.A.J. & Driscoll, C. (2017) *Acacia wollarensis* (Fabaceae, Mimosoideae sect. Botrycephalae), a distinctive new species endemic to the Hunter Valley of New South Wales, Australia. *Telopea* 20:125-136.
- Bell, S.A.J. and Driscoll, C. (2020) Data-informed Sampling and Mapping: an approach to ensure plot-based classifications locate, classify and map rare and restricted vegetation types. *Australian Journal of Botany*. 18 August 2020.
- Bell, S., & Driscoll, C. (2023). *Acacia pendula* (Fabaceae: Mimosoideae) in the Hunter Valley of New South Wales: Cunningham's collection from April 1825 and its implications. *Telopea*, 26.
- Bell, S., Branwhite, B., & Driscoll, C. (2005) *Thelymitra adorata* Jeanes ms (Orchidaceae): population size and habitat of a highly restricted orchid from the Central Coast of New South Wales. *The Orchadian* 15(1): 6-10.
- Driscoll, C. & Bell, S.A.J. (2006) Vegetation of the Tomago and Anna Bay Sandbeds, Port Stephens, New South Wales: Management of Ground Water Dependent Ecosystems. Part 2 – Groundwater Dependency. Unpublished Report to Hunter Water. Eastcoast Flora Survey. August 2006.

- Bell, S., Peake, T., and Driscoll, C. (2007) Dealing with taxonomic uncertainty in Weeping Myall *Acacia pendula* from the Hunter catchment, New South Wales. *Australasian Plant Conservation* 16(1) 14 – 15.
- Driscoll, C. (2003) The Pollination Ecology of *Tetratheca juncea* (Tremandraceae): finding the pollinators. *Cunninghamia* 8(1):133-140.
- Swe T.M., Williams W.J., Schmidt S., Potgieter A., Cowley R., Mellor V., Driscoll C., Zhao Y. (2022) Exploring the relationship between biocrusts and grass cover for land management systems from smart phones in a northern Australian savanna. *The Rangeland Journal*. In review.
- Williams, W.J., Budel, B., & Driscoll, C. (2008) *Biogeography and Biodiversity of Biological Soil Crusts across Queensland*. Australian Rangeland Society. 15th Biennial Conference, Charter's Towers. September 2008.
- Williams, W.J., Driscoll, C., Williams, S. & Ezzy, L. (2014) *Ecosystem engineers of the micro-savannah. A study of biological soil and rock crusts with a special focus on cyanobacteria from Pungalina-Seven Emu Nature Reserve, Northern Territory*. Report prepared for Australian Wildlife Conservancy.
- Williams, W., Chilton, A., Schneemilch, M., Williams, S., Neilan, B. and Driscoll, C. (2019) Microbial biobanking – cyanobacteria-rich top soil facilitates mine rehabilitation. *Biogeosciences*, 16, 2189–2204.
- Williams W.J., Schmidt S., Zaady E., Alchin B., Swe T.M., Williams S., Dooley M., Penfold G., O'Reagain P., Bushell J., Cowley R., Driscoll C., Robinson N. (2021) Resting subtropical grasslands from grazing in the wet season boosts biocrust hotspots to improve soil health. *Agronomy* 2022, 12, 62.

Enclosure 5

Geordie Oakes Curriculum Vitae

Geordie Oakes

Principal Heritage Specialist

Qualifications

Graduate Certificate in Paleoanthropology,
University of New England (2017)

Bachelor of Arts (Hons) Archaeology -
Historic/Pre-historic, Sydney University (2007)

Diploma of Information Technology (2001)

Affiliations

Australian Archaeological Association – Member

Australian ICOMOS – Associate Member

Certificates & Training

NSW 'White Card' General Safety Induction
(Construction Industry) #CGIO1142255SEQ1

NSW RIW Rail Safety Worker Card #RSN0010080545-
100

4WD Training – Getabout Training Services

Career History

Geordie has an Honours Degree in Historic / Prehistoric Archaeology from the University of Sydney and has worked as a heritage consultant for over 15 years. Geordie has worked on a wide range of projects in a number of states including NSW, ACT, VIC and NT. As a result, he has gained extensive experience in undertaking both Aboriginal and historic heritage assessments, in addition to developing critical professional skills.

Key skills include community consultation, project management, report preparation, archaeological survey and excavation, and artefact analysis. With a background in information technology, Geordie also has experience in GIS mapping and database systems, bringing additional value to projects he is involved with.

Geordie has worked on Aboriginal and historic heritage assessments for both the public and private sectors across a range of industries with a focus on **mining**, linear infrastructure projects, urban development and commercial building development.

In addition to heritage assessments, Geordie has also prepared Section 90 Aboriginal Heritage Impact Permits (AHIPs), ACHMPs, Care Agreements, Section 60 and Section 57 exemptions.

Detailed Experience

Selected mining projects include:

Maxwell Coal Project Modification 2 2022 ACHAR. Project Manager responsible for coordinating consultation, fieldwork and reporting.

Maxwell Coal Project Modification 1 2021 ACHAR. Project Manager coordinating all aspects of the assessment including fieldwork, reporting and stakeholder liaison.

Maxwell Coal Project ACHAR 2019 (Malabar Coal). Project Manager coordinating all aspects of the assessment including fieldwork, reporting and stakeholder liaison.

Maxwell Solar Farm ACHAR 2019 (Malabar Coal). Project Manager coordinating all aspects of the assessment including fieldwork, reporting and stakeholder liaison.

Bengalla Continuation of Mining ACHAR, ACHMP & Salvage 2012-2017 (BMC). Project Manager coordinating all aspects of the assessment including fieldwork, reporting and stakeholder liaison.

Moolarben Mine Rockshelter Excavation 2015 (Moolarben Coal Operations). Project Manager coordinating all aspects of the assessment including fieldwork, reporting and stakeholder liaison.

Bylong Coal Project 2015 (Kepco). Historic heritage lead responsible for planning and completing fieldwork, and lead author of historic heritage assessment.

Rixs Creek Mine Expansion 2015 ACHMP. Primary author of the ACHMP and responsible for stakeholder consultation.

Drayton South ACHMP 2015. Primary author of the ACHMP and responsible for stakeholder consultation.

Integra Open Cut Project (2013) (Integra Operations) ACHAR. Geordie completed the Aboriginal heritage impact assessment for the Integra Open Cut Project. Geordie assisted with preparation of the ACHMP.

Drayton South Aboriginal Heritage Assessment and ACHMP 2011 Project Manager coordinating all aspects of the assessment including fieldwork, reporting and stakeholder liaison.

Coalpac Consolidation Project (2011) (Coalpac) ACHAR and HIS. Geordie assisted with the

completion of the Aboriginal assessment and authored the historic heritage impact assessment. Geordie also provided technical review of the ACHMP.

Ravensworth Operations (2009-2011)(Xstrata). Geordie completed multiple Aboriginal heritage assessments as well as yearly monitoring programs at Ravensworth Mine.

Narama Extended Project (2011) (Xstrata). Geordie managed the archaeological salvage program, including the preparation of a Section 90 AHIP for the Narama Extended Project.

Maules Creek Coal Project (2010) (Aston Resources). Geordie assisted with the Aboriginal archaeological and cultural heritage assessment for the Maules Creek Project near Boggabri. Geordie also helped prepare the ACHMP for the project.

Muswellbrook Mine Extension Project (2010) (Muswellbrook Mine). Geordie prepared the ACHAR assessment for the Muswellbrook Mine Extension.

Mt Arthur Coal Consolidation Project (2009) (BHP). Geordie assisted with the Aboriginal archaeological and cultural heritage impact assessment.

Heritage Related Professional History

2009 - Present

AECOM

Archaeologist

2007- 2008

Heritage Concepts

Archaeologist