



mirrabooka
Consulting

Environmental Assessment and Management Services

Capability Statement





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Consulting

**Unit 2, 446 Enoggera Road
ALDERLEY QLD 4051**

**PO Box 3030
STAFFORD QLD 4053**

Phone: (07) 3356 6211

Fax: (07) 3356 6411

Email: enquiries@mbookaconsulting.com

Visit Our Website:

www.mbookaconsulting.com



BUSINESS PROFILE

Mirrabooka Consulting Pty Ltd is a specialist industrial consulting business providing strategic environment, health & safety, process improvement, and sustainability assessment and management services to a diverse range of clientele. Mirrabooka Consulting has undertaken numerous environmental consulting projects for industrial, agricultural, construction, municipal and Government clients.

Since our inception in 2001, we have grown into a multi-disciplinary consulting company specialising in practical, cost effective solutions for industry. Our unique blend of industrial experience and high level scientific expertise has given us an exclusive reputation for providing practical, cost effective solutions. Our professional consulting staff of engineers and scientists have the experience and expertise to assist you with your environmental, health & safety, process improvement and sustainability needs.

Our Services Include:

- Environmental air quality and air dispersion modelling
- Environmental toxicology, pathology and public health risk assessments
- Plume dynamics and aviation safety studies
- Wind energy studies
- Odour and dust assessments
- Environmental noise and vibration assessments
- Meteorological services
- Environmental licensing, management programs, plans, auditing and systems
- National Pollutant Inventory services
- Greenhouse Challenge inventories and agreements
- Scientific software development
- Dangerous goods and hazardous substances risk assessments
- Quality, Environmental and Safety management systems to International Standards, and integration of these systems to achieve optimum performance.

Our Mission:

Mirrabooka Consulting's mission is to provide high quality, technically sound and professionally documented environmental assessment and management services delivered to our clients on time and on budget.

We recognise that the ongoing success of our business is dependent on repeat business from our clients. We will:

- Maintain a strong internal focus on our processes, products and service quality in order to meet the highest possible standards and continually improve all of our activities.
- Promote and support a continuous learning culture within the organization with personal and professional development for all of our staff a high priority.
- Actively and professionally manage our projects and place emphasis on the time, cost, quality and business relationship aspects of our clients needs.
- Seek opportunities to add value to our clients businesses by providing specialist advice and direction.
- Keep ourselves and our clients informed about the latest trends and developments in the areas in which we specialise.

PRINCIPAL STAFF

Dr Tim Scholz : PhD, M.Sc, B.Sc.Hons (First Class), MBBS - Director, Senior Technical Advisor and Principal Consultant.

Tim Scholz holds a PhD in Theoretical Physics from the Queen's University of Belfast and a Bachelor of Medicine/Bachelor of Surgery (MBBS) from the University of Queensland. Tim has performed air dispersion modelling projects for many years. During this time he has taken a senior technical role in many of the larger environmental assessment projects in Queensland, including the Stuart Oil Shale project, Millmerran Power Station, BP Bulwer Island Cogeneration Plant EIS, Tarong Power Station EIS, Camalco's Weipa Plant and Mine plus many others. He has also conducted assessments in other states of Australia and for the New Zealand Aluminium Smelters as part of their licensing negotiations. Tim is recognized as one of the leading scientists in the field of air dispersion modelling and has made many presentations and submissions at all levels within client organizations and the EPA. Tim is fully conversant with all aspects of air dispersion modelling codes and has written many computer programs for specialist applications.

Tim performs the senior technical role at Mirrabooka Consulting and is responsible for technical direction on all major projects.

Brian Koks : AD Mech Eng, Grad Dip Quality, GCEM - Director, Operations Manager and Principal Consultant.

Brian has more than 20 years industry experience, having worked in capacities ranging from trade apprentice to Quality Assurance Manager, Corporate Services Manager and more recently, Operations Manager for an environmental air quality consultancy in Brisbane. Whilst in industry, Brian developed and implemented many process, quality, safety and environment performance improvement projects including a significant odour reduction program for a leading Brisbane foundry.

Brian commenced his career as an environmental consultant in his own practice in 1997. Since then he has undertaken and managed numerous consulting projects including chemical and flammable goods storage design, risk assessments, QA, Safety and Environmental Management Systems, odour and dust investigations, emissions estimation and Greenhouse Challenge and NPI inventories and reports. For a number of years, Brian has specialised in the area of odour impact assessment and is recognized for his pragmatic process oriented approach to the resolution of odour issues.

Brian has extensive project and industrial management experience and is able to understand the practical application of environmental policy issues. His pragmatic approach and practical experience has enabled him to develop and implement environmental management systems, improvement plans and procedures in a diverse range of industry sectors. He has provided input into industry submissions on issues such as environmental legislation, industry training programs, odour policies, the National Pollutant Inventory (NPI) and various greenhouse gas abatement programs.

Dr Gary Venz : Ph.D, B.App.Sc. (Hons First Class), GAIP- Environmental Physicist.

Gary is a physicist with six years of research experience and a PhD in experimental physics. He has a background in materials science, experimental physics, and the use of statistical and computational techniques in the analysis of scientific data.

After completing his undergraduate degree in 1995, he was awarded the Dean's Award for Excellence, for achieving the highest grade-point-average in his course. From 1996-1998, he was the recipient of an Australian Postgraduate Award (APA) scholarship. Gary worked for seven years as a part-time laboratory and tutorial supervisor in the School of Physical and Chemical Sciences at the Queensland University of Technology. During this time, he tutored and supervised undergraduate students in a wide variety of topics including: optics, quantum physics, materials science, radiation physics, mechanics, electronics, computing, statistics, and general physics.

Since joining Mirrabooka Consulting in a senior technical role, Gary has conducted air quality and noise assessments for a variety of projects throughout Australia. These assessments have been performed for clients from a wide range of industries including poultry farming, steel forming, galvanizing, timber processing, fiberglass manufacture, asphalt processing, feedlots and petroleum refining. He has extensive experience in the use of meteorological and air dispersion models including TAPM and AUSPLUME, and has developed a range of software modules for use in air quality assessment projects.

Gary has taken a senior role in developing a range of consulting services for the aviation industry. These include: assessments of meteorological conditions and their application to aircraft operational procedures for specific airports, plume-rise assessments (to determine the possible influence of emitted plumes on aircraft safety) and investigations of air quality issues associated with airport operations.

Gary has appeared in the Planning and Environment Court of Queensland as an expert witness, addressing air quality issues associated with a regional land-fill development, and has conducted dangerous goods risk assessments for health-care facilities.

Jeff Smith: B Eng (Env), IIA Hons – Environmental Engineer

Jeff graduated as an environmental engineer in 1996 and since that time has largely specialised in the field of emissions estimation and emissions inventories. He has worked on numerous projects involving the quantification and assessment of emissions from facilities such as chemical plants, petroleum refineries, alumina refineries, power stations, airports, galvanizing plants, landfills and mine sites. In September 1996, Jeff attended an Air & Waste Management Association (A&WMA) conference in New Orleans, which covered a variety of air quality issues and involved a workshop on estimation of VOC emissions from refineries.

Jeff has also been involved in regional emission inventories for the Wellington Regional Council (WRC), the Otago Regional Council (ORC), and various aspects of the SEQ inventory for the Queensland EPA. He has prepared National Pollutant Inventory (NPI) Emission Estimation Technique Manuals for the petrochemical, organic chemical, alumina refining and aluminium smelting industries and undertaken numerous NPI assessments for industries such as power stations, hospitals, meat rendering facilities and mineral sand mining and processing plants.

Jeff has also prepared Greenhouse Challenge inventory reports, performed health risk assessments, dispersion modelling using Ausplume and ISC3, and estimation of odour emissions from agricultural facilities.

Nicolette Parham: BSc in Ecology & Conservation Biology – Graduate Environmental Scientist

During her undergraduate degree Nicolette completed studies in land and water management with a focus on whole catchment processes and soil erosion modelling involving existing and future land use practices. She also undertook several projects focused on biological diversity and integrity in relation to anthropogenic influences such as air and water pollution, forest edge effects and impacts of introduced species. Furthermore, Nicolette has undertaken studies in air pollution modelling including stack emissions, automotive traffic emissions and workplace and home environment contaminants and sources.

Whilst studying for her undergraduate degree Nicolette gained valuable industry experience in a voluntary capacity within Queensland Environmental Protection Agency's Parks & Wildlife Service and Redland Shire Council's Conservation Department. Prior to joining Mirrabooka Consulting Nicolette worked for a health, safety and environment (HSE) consultancy and was involved in consulting projects within the energy sector. Since joining Mirrabooka Consulting in July 2005, Nicolette has been involved in a number of air quality consulting projects, predominantly fulfilling the reporting requirements of the National Pollution Inventory.

PRODUCTS AND SERVICES

Air Dispersion Modelling

Air dispersion modelling represents the most effective means of predicting air pollution impacts associated with regional, local and/or specific industry emissions at locations surrounding the source. Dispersion modeling is a specified requirement of virtually all environmental authorities for licensing compliance and development approval applications. In addition to assessment of the spatial extent of pollutant concentrations and compliance with regulatory limits/guidelines, the pollutant concentrations calculated by the model may be used to assess important operational aspects such as the relative contribution of individual sources, the effects of important release parameters such as stack height, temperature and velocity, as well as management options such as changes to operating hours or equipment operation.

Mirrabooka Consulting has extensive experience in the application of air dispersion codes including the most recent 3-dimensional codes, TAPM and CALPUFF, to a variety of industrial and regional activities. Dr Scholz has also developed photochemistry codes which integrate with the Gaussian Plume models such as AUSPLUME and Industrial Source Complex 3 (ISC3).

TAPM (developed by CSIRO) is a world class meteorological and air dispersion model. Its air dispersion module is unique in that it evaluates its own 3-dimensional meteorological dataset using the fundamental equations of the atmosphere in combination with a meteorological database that spans the entirety of the region under study. The dispersion algorithms take into account full 3-dimensional influences of the atmosphere including plume history (and hence recirculation), turbulence, drainage flows and the development of internal boundary layers in coastal regions. The meteorological data generated by TAPM can also be used as input into a variety of other air dispersion models such as Calpuff, AUSPLUME and ISC3.

CALPUFF was developed by the US EPA and is the most sophisticated air dispersion model available in the US. In common with TAPM, it takes into account the full 3-dimensional variation of the atmospheric parameters. However it is unable to generate its own meteorological data and so is dependent upon observations from meteorological stations or on data generated by TAPM or other meteorological modeling programs.

Certain air quality assessments do not require the implementation of 3-dimensional models. Gaussian models such as the US EPA's ISC3 or Australia's AUSPLUME are often adequate for regions with relatively simple terrain and meteorological influences. In these instances regulatory authorities accept that the application of these simpler models is sufficient for licensing compliance and development applications.

Mirrabooka Consulting's expertise in air dispersion modelling extends beyond simply running models. Our staff have a thorough understanding of the limitations of each model and the experience to select the most appropriate model for each individual situation. Mirrabooka Consulting is therefore better placed than many of its competitors to advise on model selection, suitability and application.



Plume Impacts on Aviation Safety

According to the Civil Aviation Regulations which accompany the Civil Aviation Act, the Civil Aviation Safety Authority of Australia (CASA) must be notified of any 'obstacle', which may affect aircraft safety. The CASA definition of an obstacle includes any plume which exceeds a vertical velocity of 4.3 m/s. Consequently, plumes emitted by industry in the vicinity of airports and aerodromes must be assessed to determine their potential impacts on aircraft safety. When any plume is determined to exceed the 4.3 m/s safety criterion, a report identifying its spatial and temporal characteristics must be submitted to CASA for assessment and approval.



Mirrabooka Consulting's senior technical advisor, Dr Tim Scholz has developed a CASA approved methodology for evaluating the variation of plume dynamics with both height above the stack top and with meteorological conditions. Dr Scholz has successfully applied this methodology to many industrial developments including BP Bulwer Island Refinery, Incitec Granulation Plant, Maryborough Sugar Mill Cogeneration Plant, Phillips Petroleum Liquefied Natural Gas Plant and the Australian Army's Robertson Barracks in Darwin.

Odour Studies

The term 'odour' is generally used to relate properties of a substance to the olfactory response it causes. Stimulation of the olfactory (and taste) cells induces 'approach' or 'avoidance' responses in the exposed individual. This helps to explain why odours are frequently described in emotive terms such as pleasant, unpleasant, sweet, offensive, foul, etc. Hence, the way in which odours are perceived has a direct influence on odour annoyance. The assessment of odour releases and corresponding judgements about the acceptability of such releases require reference to criteria principally aimed at avoiding nuisance impacts.

The occurrence of odour in the near vicinity of industrial, agricultural or municipal facilities is generally not considered to be an environmental problem unless the odour is noticeable and causes offence to persons off-site. However, in terms of complaints, odour is the single most contentious air quality issue in Australia. It is also often the most significant atmospheric release from many industrial, municipal and agricultural sources including foundries, food manufacturing plants, rendering plants, meatworks, paper mills, landfills, sewage treatment works, piggeries, broiler farms and feedlots. Odour impact assessment is therefore of great importance to many industries, local governments and State authorities. Such assessments require an understanding of odour plume behaviour, odour sampling and measurement techniques, odour assessment criteria and community response to odour annoyance.

Odour control technologies are relatively well developed, and for a price, most odour emissions are capable of being controlled to the degree necessary. The issue that faces managers responsible for dealing with odour complaints is how to adequately address and control emissions within budgetary and resource constraints. Often, a strategic approach is needed to manage complex technical, legal and community issues.

Mirrabooka Consulting is recognised for its practical, holistic approach to odour assessment and management. We have undertaken numerous odour studies for clients in a diverse range of industries including municipal landfills, fiberglass and chemical manufacturing, foundries, galvanising plants, intensive agriculture and asphalt plants. Our staff have presented odour assessment workshops for Australian Industry Group and prepared EMPs and management plans for odour remediation. In addition, Mirrabooka Consulting has made submissions, on behalf of clients, to the NSW EPA regarding odour assessment methodology. These submissions have subsequently been integrated into official EPA policy.

Environmental Noise and Vibration Assessments

Environmental noise constitutes the largest source of nuisance complaints to the EPA and local councils. Assessment of potential noise and vibration impacts is a crucial aspect of virtually all development approvals. Most industrial licences include compliance criteria relating to noise emissions. Careful planning during the design and impact assessment phase of new developments can avoid expensive remediation in the future. For both existing and proposed premises, accurate characterization of noise sources in terms of sound power levels and frequencies, tonality and intrusiveness is required.

This noise source information is used in modeling studies that provide prediction of noise impacts in the local community. For the case of existing facilities, the modeling results complement data obtained in a noise monitoring study. For proposed developments, modeling is often the only means of quantifying predicted impacts.

Our pragmatic approach to noise nuisance assessment is based on years of industrial experience. Our thorough understanding of noise propagation algorithms, on-site monitoring issues, and the use of sophisticated noise prediction models ensures thorough and accurate environmental noise and vibration assessments that reliably quantify impacts to a standard beyond that demanded by regulatory authorities.

Wind Energy Studies

Rapid advances in the design and energy efficiency of wind turbines over the last 10 to 15 years has led to wind energy becoming one of the world's fastest developing renewable energy sources. An estimated 20,000 wind turbines are in operation around the globe. Turbine sizes range from a few watts to several megawatts and blade lengths of 30 metres and tower heights of 80 metres are not uncommon.

Site selection is crucial to the success of a commercial wind farm. To optimize this selection process, Mirrabooka Consulting utilizes the most recent meteorological models to evaluate important site-specific wind characteristics including wind speed and direction, diurnal and seasonal variations, available wind power, potentially damaging wind shear and turbulence. These models can produce wind energy statistics at any height above the ground, at any site in the world (excluding the north and south poles).

Wind energy screening is essential for all potential wind energy projects, particularly for sites where extensive historical wind data is not available, or has not been measured at the height of the generator.



Environmental Management Services

Environmental Management has been one of our areas of specialty for many years. We have undertaken site audits, prepared environmental management plans, developed and implemented formal management systems and undertaken best practice studies for numerous clients in a diverse range of industries including energy supply and distribution, municipal landfills, construction, manufacturing, mining, health services, chemical manufacture, abattoirs, and bi-products rendering.



Mirrabooka Consulting offers a complete range of Environmental Management services to industry including compliance audits, preparation of environmental management plans, complete ISO 14000 compliant environmental management systems, Best Practice studies, sustainability assessments and strategic planning services. We specialize in the integration of management systems for Quality Assurance, Health and Safety, and Environmental Management. Our structured three-tier approach will ensure that your systems are easily understood, effective and efficient. Our practical perspective and industrial management experience will ensure practical, cost effective solutions to environmental management issues.

Environmental Toxicology, Pathology & Public Health

Environmental pollutants and pathogens have the potential to produce a range of undesirable human health effects. Community concern about the health effects of pollutants is becoming increasingly important at all levels of Government. Positive corporate citizenship also requires public disclosure of expected health impacts arising from business activities. To avoid future liabilities and litigation, it is essential that all businesses understand the implications of their public health risks. Businesses that act now to minimize risks to public health will benefit from reduced exposure to regulatory controls and litigation in the future.

Our public health risk management services include:

- Analysis and evaluation of human health and ecological risk consequences
- Integration of environmental, technical, social, financial, and regulatory factors into risk management decisions
- Problem prevention strategies
- Employee and stakeholder training and education
- Design and implementation of due diligence and continuous improvement programs such as EMS and ISO 14000

Emission Estimation and Emissions Inventories

Emission inventories provide a baseline of current performance, aid decisions about pollution reduction measures and are a central platform of mandatory environmental accounting schemes such as the National Pollutant Inventory, the proposed Energy Efficiency Opportunities Assessment program, as well as voluntary agreements such as the Greenhouse Challenge program. These programs are intended to increase awareness of emission and energy performance and promote the benefits of improved efficiency and emission reductions.

It is common practice for emissions inventories to be based on emission estimation techniques, or a combination of estimation and direct measurement techniques. Emission estimation techniques are often required for impact assessment of proposed developments where no direct measurement data is available prior to commissioning.

The principals and staff of Mirrabooka Consulting have extensive industry experience and are familiar with the development, application and practical use of inventories such as the National Pollutant Inventory and the Greenhouse Challenge Program. We have undertaken NPI and Greenhouse Challenge consulting projects for clients in the mining, health care, rendering, electricity generation, electricity and gas distribution, and manufacturing industries. Our consulting projects include application and use of published emission estimation techniques, mass balance, engineering equations and monitoring data for calculation of facility emissions as well as research and development of alternative emission estimation techniques.

Our staff have developed and delivered NPI workshops on behalf of Australian Industry Group, provided input to industry policy submissions on the NPI and assisted in the preparation of several emission estimation manuals. In 1999, Brian Koks was nominated for an Energex environmental services award for his work on Energex's Greenhouse Challenge Inventory and report.

Scientific Software Development

Computer hardware continues to develop at a rapid rate. Hardware costs have decreased significantly whilst performance and reliability have increased. Unfortunately the potential benefits of modern computing are often unharnessed because generic software programs are unable to solve your business specific problems. This results in missed opportunities for improvements in operational efficiency and profitability.



Individual software requirements are tremendously varied. They range from in-depth numerical solution of large-scale analytical problems to relatively simple database applications. In addition to accurate numerical methods, a well-designed Graphical User Interface (GUI) is also essential to maximize the benefits of your investment in customized software. This interface must include error checking of user inputs at many levels to remove human error as much as is possible. Window layout must also be carefully considered.

Through the services of Mirrabooka Consulting customized software solutions are at hand. Our highly trained staff have many years of software engineering experience. This expertise can be applied to your business to develop customized software programs that will assist you to achieve your analytical and productivity goals.

Sustainability and Strategic Planning

Most authorities agree that current human activity is no longer sustainable over the medium to long term. There is much uncertainty about how the human race will move towards a sustainable occupancy of the planet, and whether such a transition is even possible. A complex mix of economic, scientific and political viewpoints exist and the available evidence seems to suggest that the shift towards a sustainable existence is very much in its infancy. Long-term strategic planning for business sustainability is perhaps the primary challenge facing business managers in the developed world.

The need for a strategic approach to business planning is increasingly being driven by international and national responses to the global sustainable development agenda. Government intervention, market transformations and community expectations present an evolving matrix of threats and opportunities for business. From a business perspective strategic planning is about making better investment decisions for long term prosperity. In the context of sustainability, it requires understanding and internalizing external threats and opportunities presented by rapid regulatory, social and economic change.

In recent times, the sustainability concept has expanded to encompass environmental, social and economic considerations. Today's corporate accountability and disclosure standards are forcing CEO's to recognise, measure, and report the so called 'triple bottom line' performance of their organisations and Business is increasingly recognising the risks posed by sustainability driven change. Investment and litigation risks are increased where corporate activities adversely impact society or the physical environment.

A strategic approach spanning timeframes measured in decades is needed to identify and respond to the risks posed by national sustainability agendas. An in-depth knowledge of current performance, as well as forecasting of future risks and opportunities is required.

Mirrabooka Consulting will assist you to understand and assess your sustainability issues, and plan for future opportunities and threats using an easy to follow methodology encompassing the following elements:

- Identify and assess current issues and prepare a business case to address business sustainability
- Identify and evaluate critical supply chain dependencies. Any business is only as sustainable as its critical customers and suppliers
- Planning over medium to long-term timeframes. Timeframes of at least 10 – 20 years are most compatible with national and international sustainable development agendas
- Consider both opportunities and threats. Future business opportunities are likely to favour organizations with both efficient technology and demonstrable long-term supply prospects.
- Research and stay informed about sustainability issues. Knowledge about emerging issues is a key requirement for future planning
- Regular review and performance appraisal. Review and confirm the adequacy of internal as well as supply chain performance against planned actions and timeframes.

