



## Melissa Salt

Melissa has significant experience in environmental management in the agricultural and construction industries in the areas of waste management, site assessment, environmental management and auditing. An accomplished communicator, Melissa instils confidence providing clear direction and pragmatic solutions in challenging and complex environments.

Melissa completed her PhD on water balance and structural development in phytocaps and conventional covers as part of the Australian Alternative Cover Assessment Program. She is also a certified Lead Auditor in Environmental Management Systems.

Melissa's experience has ranged from research and development to field consultation and advice, including preparation and implementation of environmental impact statements and management plans and environmental site assessment.

### Specialisations

- **Phytocaps**
- **Waste and Wastewater**
- **Site Contamination Assessment**
- **Acid Sulphate Soil (ASS) Investigations**
- **Environmental Works for Construction, including Audits**

### Career Summary

Total experience	25 years
2013 to present	Principal Scientist, Tonkin Consulting, SA
2004 to 2013	Senior Scientist, Tonkin Consulting, SA
2002 to 2004	Project Scientist, Tonkin Consulting, SA
2000 to 2002	Environmental Consultant, conSalt Pty Ltd
1995 to 2000	Soil and Environmental Manager, L.V. Rawlinson & Associates Pty Ltd, NSW
1993 to 1995	Technical Officer (Scientific), Biosolids Research Programme, Organic Waste Recycling Unit, NSW Agriculture

### Qualifications

- PhD University of Adelaide "Water Balance and the Influence of Temporal Factors on Final Covers for Landfill Closure"
- Bachelor of Science in Agriculture (1st class Hons). Major in Soil Science, University of Sydney
- Lead Auditor in Environmental Management Systems

### Affiliations

- Certified Professional Soil Scientist, Australian Soil Science Society Inc. (ASSSI)
- Member CPSS Accreditation Board
- Member, Waste Management Association of Australia
- Member, Australian Land and Groundwater Association

## Key Experience

### Landfill Closure and Monitoring

- Design of trials to rehabilitate salt pits at Dry Creek Saltfields. Documentation included updated environmental outcomes of PEPR and capping design
- Preliminary assessment of potential materials for rehabilitation of Dry Creek saltfields on behalf of Buckland Dry Creek;
- On-going trial assistance for phytocaps at Southern Waste ResourceCo (10 years data); Southern Region Waste Resource Authority (3 years), Inkerman Landfill (4 years); Melbourne Regional Landfill (1 year)
- Construction of phytocaps at Port Lincoln (SA), Inkerman (SA), McLaren Vale (SA), Loxton (SA), Ravenhall (Vic).
- Alternative capping designs and/or trial designs for:
  - SA: Port Lincoln Resource Recovery Centre, Wingfield Landfill, SRWRA Landfill, Northward Fill, Inkerman, Loxton Landfill, Monash Landfill
  - Vic: Victory Rd Landfill, Wests Road Landfill, Melbourne Regional Landfill, Drysdale Landfill, Rye Landfill, Eaglehawk Landfill, landfill near Bacchus Marsh
  - NSW: Gunnedah Waste management Facility
  - Qld: Swanbank Landfill
  - NT: Alice Springs Town Council Landfill.
  - WA: Banksia Rd Landfill
- Modelling landfill gas emissions from Garden Island
- Preliminary assessment on potential for eachate irrigation at 3 Melbourne Landfills
- Providing technical review and assistance on landfill gas monitoring studies at a number of South Australian landfills, including Sturt Reserve, Eden Hills and Garden Island.
- Peer Review of Capping Options Investigation for Mugga Lane Landfill, ACT No Waste and of proposed rehaibitation of a closed landfill in Northern Territory
- Attendance at Landfill Gas Investigation, Risk Assessment and Remediation training in 2012
- Assessment of stockpiled soil materials and soil:biosolids blends based on physico-chemical properties for suitability for use in final caps.
- Modelling studies to develop optimal phytocover system designs at several Australian sites.
- Modelling water balance through an alternative cap at Wollert Landfill and using 2 years of monitoring data to calibrate and validate modelling output.
- Wingfield Landfill design involved undertaking a literature review of alterative designs being used overseas, attending a meeting of the Phytoremediation of Organics Action Team in the US

on “Designing, Building and Regulating Evapotranspiration (ET) Landfill Covers, modelling water balance of conventional and alternative landfills using WAVES and comparing performance of modelled scenarios.

- Attending and participating in Environment Resource and Development Court on matters pertaining to landfill capping and after-care.
- Providing advice to Goldfield Shire Council on testing and phytocap design in accordance with VicEPA guidelines.
- Technically reviewing a moisture monitoring study to validate a phytocap at an Adelaide local council landfill.
- Monitoring and interpreting groundwater and LFG results for active and closed landfills.
- PhD student and researcher in Australian Alternative Cover Assessment Program, which researched phytocaps in five states of mainland Australia.

### Wastewater and Sludge Reuse

- On-going monitoring and assistance for wastewater irrigation from food processors, wineries and rendering plants in SA’s south-east.
- Preparing 15 Year Forward Management Plan and Annual Sustainbaility Report for Tamworth Effluent Reuse Farm
- Undertaking Independent Verification of Monitoring Programmes and preparing Environmental Monitoring Programmes and Irrigation Management Plans for effluent from STEDS, wineries, abattoirs, rendering plants, milk processing, timber mills, etc.
- Training EPA officers in the site and soil management for wastewater irrigation applications.
- Preparing a literature review on “Nutrient Movement Through SA Soil” for the SA EPA, with particular focus on the movement of nitrogen and phosphorus and management options for wastewater disposal systems.
- Preparing a Soil Erosion and Drainage Management Plan for the Garden Island Landfill Closure Plan
- Preparing trial proposal for monitoring leachate quality, soil nutrient status and native tree growth after biosolids application for gold mine site rehabilitation. The documentation was for approval by VicEPA on behalf of Coliban Water.
- Establishing and maintaining trials to research the potential changes to soil physical properties following the application of biosolids to agricultural land, including assessing infiltration and runoff characteristics under natural and simulated conditions, moisture retention and bulk density.

- Characterising trial sites by undertaking soil survey, landscape assessment and performing physical and chemical tests in the field and laboratory.
  - Undertaking trials to determine stabilisation and contamination grades for biosolids under the NSW EPA Guidelines. Trials include composting, alkaline stabilisation, mulching and drying.
  - Assessment of soil, water, wastewater and plant monitoring data from wastewater irrigation sites for NSW EPA. Statistical analyses of data provided by various industries were performed to assess the usefulness and appropriateness of the EPA's monitoring requirements.
  - Assessing site and soil conditions with respect to their ability to be used for application of wastewater and/or organic wastes. Monitoring soil and water quality on sites before and/or after application of wastewater or sludge.
  - Liaising with key regulatory authorities in SA (including EPA, DWLBC, PIRSA), NSW (including EPA and DLWC), Victoria (including EPA and DNRE), Queensland (including EPA) and Western Australia (including DEP and WRC).
  - Site assessment of proposed on-site wastewater disposal areas for NSW National Parks and Wildlife Service. Site assessment involved soil sampling for chemical and physical testing, infiltration testing and providing recommendations on the suitability of proposed sites for effluent disposal in accordance with NSW guidelines and best management practices.
  - Assessment of on-site wastewater systems in Robertson township, NSW. The assessment included interviewing residents and inspection of on-site wastewater systems as well as undertaken soil suitability assessment on a large-scale grid over Robertson township.
  - Preparing Reviews of Environmental Factors and management plans for land application of wastewater and sludges, including site and soil assessment and liaison with regulatory authorities.
  - Supervising land application of organic wastes for LVR&A and public and private sector clients (including WA Water Corporation, Mid Coast Water, Gippsland Water, OTV Kruger and Inghams Enterprises). Supervision involved liaising with machinery operators and the client and ensuring compliance with EPA requirements and best management practices.
  - Specialist auditor for Thiess Environmental Services. This audit required understanding of legislation and best management practices relating to biosolids processing and management to ensure compliance.
  - Biosolids management advice for Walter Vivendi Joint Venture proposal in response to Sydney Water's tender for upgrading sewage treatment plants on the NSW South Coast.
  - Market assessment for compost in the Hunter Valley for L.V. Rawlinson & Associates and Thiess Services.
  - Effluent Reuse Study for Bombo STP on behalf of Sydney Water. This role was predominantly undertaking a literature review and liaising with farmers and other potential effluent users.
- Site Contamination Assessment**
- Preparation of Voluntary Site Remediation Plans, Environment Improvement Programs and Groundwater Monitoring and Management Plans for various industries.
  - Assessment of waste soil and industrial residues for potential uses as waste derived fill and/or soil enhancers in accordance with SA Standards.
  - Historical research into the land use of various contaminated sites, identification of site potential contamination and preparation of site history reports.
  - For industrial sites and local government, project management, contamination assessments of soil and groundwater with respect to Heavy Metals, PAHs, TPH and BTEX, OCP/OPs etc., recommendations on remediation programmes and supervision of remediation works.
  - For council and government depots, contamination assessments and remediation proposals, as part of environmental clean-up procedures, and reporting on assessment of contaminated soil and groundwater, with respect to BTEX, TPH, PAHs and Heavy Metals. Supervision of remediation works, including contaminated soil excavation and replacement, and preparation of validation reports.
  - Sites included Waikerie, Angaston and Lyndoch Council Depots, former commercial/industrial sites in Adelaide metropolitan areas and a former landfill for Tamworth City Council.
- Acid Sulphate Soil (ASS) Investigations**
- Preparing a detailed ASS Management Plan for placement of up to 5 m of fill for a 6 lot subdivision at East Arm, Darwin NT. The project was located in a mangrove swamp and involved assessing and recommending management of material with significant potential to generate acid.
  - Identifying and assessing ASS for the proposed Cape Jaffa Marina and Arno Bay Marina and preparing a Construction Management Plan for ASS.
  - Identifying and assessing potential for red staining along the Adelaide-Crafers highway to be acid mine drainage from soil or rocks exposed during construction of the highway for Transport Planning Authority. Staining was related to iron dissolution from rocks but was more likely due to acidification of rainfall through sandstone (a natural phenomenon) than with pyrite-rich rocks.

- Provision of staff training in the identification and field testing of soil.
- Preparation of Construction Management Plans for the identification and management of ASS along the SEA Gas pipeline route from Port Campbell Victoria to Pelican Point, South Australia.
- Identifying and managing ASS excavated on the Duke Energy pipeline from Longford, Victoria to Sydney, NSW. I was the on-site Environmental Officer responsible for identifying and managing ASS excavated along the pipeline route, with potential ASS encountered in the swamps in far east Gippsland in Victoria.

### Environmental Works for Construction, including Audits

- Preparation of Construction Environment Management plans, including Dust Management Plans, and Sediment Erosion and Drainage Management Plans for a number of South Australian construction projects, including pipelines, oval refurbishments and jetties/marinas.
- Training Department of Planning, Transport and Infrastructure's Field Officer on Soil and Erosion Drainage Management Plans.
- Auditing road and rail construction projects as an external auditor for Department of Transport, Energy and Infrastructure. Projects have included: Upper Yorke Peninsula Project, Sturt Highway Duplication, Gawler Interchange to Scott Rd; Belair Passenger Railway Revitalisation; Blackwood Railway Station Upgrade; Glenelg Tram Overpass.
- Internal audit and training of construction staff in water quality sampling.
- Undertaking and reporting water quality monitoring for road and rail projects.
- On-site environmental supervision of linear construction projects including Alice Springs to Darwin Railway Line (ADRail), Eastern Gas Pipeline (Transfield Willbros Macmahon Joint Venture), Patricia Baleen Pipeline (Transfield), East Hills Railway Line (Fluor Daniels) to ensure compliance with contractual and legislative environmental requirements and with consideration of best management environmental practices. For the Eastern Gas Pipelines, Patricia Baleen Pipeline and East Hills Railway Line, the role included Community Liaison Officer. For most projects, implementation of EMPs and the construction of environmental works (e.g. erosion and sediment control devices) was required. For the East Hill Railway Line, auditing of sub-contractors was required, however, it was often necessary to become involved in directing and implementing the necessary environmental works.
- Preparation of environmental management plans for SEA Gas Pipeline and Port River Expressway.
- Undertaking site inspections and environmental monitoring for the Port River Expressway.
- Undertaking field work and preparation of background documentation for Environmental Impact Statement for Cape Jaffa Anchorage Marina.

### Publications

- Salt, M., Yuen, S.T.S., Ashwath, N., Sun, J., Benaud, P., Zhu, G.X., Jaksa, M.B., Ghadiri, H., Greenway, M., Fourie, A.B. (in print). 'Phytocapping of Landfills' in *Solid Waste Landfilling* (ed. by Cossu, R. and Stegmann, R.) 1<sup>st</sup> edn. Elsevier Publishers.
- Salt, M.R. 2015. 'Eight Years of Performance of Final Covers' in 6<sup>th</sup> WMAA Landfill and Transfer Stations Conference, Canberra, July 2015
- Salt, M.R., Jaksa, M.B., Cox, J.W. and Lightbody, P.J. 2014. 'Final Cover Performance in the Australian Environment – The A-ACAP Field Trials' in 7<sup>th</sup> International Congree on Environmental Geotechnics, Melbourne November 2014
- Salt, M and McArdle, C. 2013. 'Assessing and Improving Old Landfill Caps to Function as a Phytocap' in 5<sup>th</sup> WMAA Landfill and Transfer Stations Conference, Gold Coast August 2013.
- Salt, M. 2013. *Water Balance and the Influence of Temporal Factors on Final Covers for Landfill Closure*. PhD Thesis, School of Civil Environmental and Mining Engineering, University of Adelaide.
- Yuen, S.T.S, Salt, M.R., Sun, J., Benaud, P., Zhu, G.X. JHaksa, M.B. Ghadiri, H., Greenway, M., Ashwath, N., Fourie, A.B. 2011. 'Phytocapping as a Sustainable Cover for Waste Containment Systems: Experience of the A-ACAP Study' in 13<sup>th</sup> International Waste Management and Landfill Symposium, Cagliari, Italy, October 2011.
- Salt, M., Jaksa, M.B., Cox, J.W. and Lightbody, P.J. 'Water Balance of Phytocaps and Compacted Clay Barriers in 5 Australian States' in Proceedings of 4<sup>th</sup> WMAA Landfill and Transfer Stations Conference, Adelaide, September 2011.
- Salt, M., Yuen, S.T.S., Jaksa, M.B., Cox, J.W. and Lightbody P.J. 2008. 'Australian ACAP - final landfill cover water balance from tropical north to semi-arid south' in Proceedings of the Global Waste Management Symposium, Denver Colorado pp.1-10
- Salt, M., Jaksa, M., Cox, J. and Lightbody, P. 2007, Water Balance Modelling for Phytocovers and Conventional Final Covers at Landfill Closure, Common Ground: 10<sup>th</sup> Australia New Zealand Conference on Geomechanics, Brisbane, Carillon Conference Management Pty Ltd for the Australian Geomechanics Society. pp.392-397
- Lightbody P, Salt M and Cox JW. 2005. 'Evaluation of performance of alternative evapo-transpiration cover designs using the WAVES (Water Atmosphere

Vegetation Energy and Solutes) model – Wingfield South Australia’ SARDINIA 2005, 10th International Waste Management and Landfill Symposium, Cagliari, Italy, October 2005. (also published in Monographic Book - Landfill Modelling, ISBN number 978-88-6265-001-4)

- Joshua, W.D., Michalk, D.L., Curtis, I.H., Salt, M. and Osborne, G.J. 1998. ‘The potential for contaminant of soil and surface waters from sewage sludge (biosolids) in a sheep grazing study, Australia’. *Geoderma*. 84:135-156.
- Joshua, W.D., Salt, M. and Osborne, G.J. 1996. ‘Changes in soil physical properties due to biosolids application to agricultural lands’ in *Biosolids Research in NSW* (eds Osborne, G.J., Parkin, R.L., Michalk, D.L. and Grieve, A.M.). NSW Agriculture, Richmond.
- Joshua, W.D., Salt, M. and Osborne, G.J. 1996. ‘Surface and subsurface movement of nutrients and contaminants after application of biosolids to agricultural land’ in *Biosolids Research in NSW* (eds Osborne, G.J., Parkin, R.L., Michalk, D.L. and Grieve, A.M.). NSW Agriculture, Richmond.
- Salt, M. Hird, C. and Bamforth, I. 1996. ‘Assessment of biosolids application rates, degree of incorporation and movement of mineral nitrogen in biosolids in biosolids treated plots’ in *Biosolids Research in NSW* (eds Osborne, G.J., Parkin, R.L., Michalk, D.L. and Grieve, A.M.). NSW Agriculture, Richmond.
- Salt, M., Rawlinson, L.V., Ferguson, K. and Alvaro, M. 1998. ‘Assessment of Biosolids Stabilisation Through Addition of Quick Lime’. *Proc. of Australian Water & Wastewater Association (AWWA) WaterTECH Conference*, Brisbane.