

14 September 2016

Planning Panels Victoria Hearing in relation to an application by Landfill Operations Pty Ltd for a Planning Permit in relation to the proposed extension of the Melbourne Regional Landfill at Truganina / Ravenhall.

Statement of:

Anthony Paul Kortegast

This witness statement has been requested by Norton Rose Fulbright on behalf of Landfill Operations Pty Ltd and accordingly, is subject to legal professional privilege.

Report Reference: 5377.mrl.need

Table of contents

1	Introduction	1
2	Qualifications and experience	1
3	Summary of Opinions	1
4	Further Research Since Advertising of the Applications	4
5	Response to Submissions	4
	5.1 Brimbank City Council	5
	5.2 Metropolitan Waste and Resource Recovery Group	5
	5.3 Stockland	7
	5.4 Mt Atkinson Holdings Pty Ltd	7
	5.5 Private Submitters including 'Stop the Tip'	7
	5.6 Victorian Waste Management Association	8
6	Declaration	9

Appendix A : Summary of Experience

Appendix B: CV

Statement of Expert Evidence of Anthony Paul Kortegast of Tonkin & Taylor Pty Ltd

1 Introduction

1 My firm prepared the specialist report titled '*Needs Assessment – Melbourne Regional Landfill*', Tonkin + Taylor, February 2016 (the **Specialist Report**) in relation to the Application for a Planning Permit [PA2016/5118] and Application for a Works Approval [1002191] (the **Applications**) for an extension of the existing Melbourne Regional landfill (MRL) located 408 Hopkins Road, Truganina and 1100-1152 Christies Road, Ravenhall. I adopt the Specialist Report in combination with this document, as my Statement of Expert Evidence for the purposes of the Panel Hearing convened to consider the Applications. As far as I am aware, the Specialist Report does not contain any errors.

2 My instructions are to prepare a statement of evidence in relation to the Specialist Report and associated submissions, in accordance with the Planning Panels Victoria 'Guide to Expert Evidence'.

2 Qualifications and experience

3 Appendix A contains a statement setting out my qualifications and experience. Appendix B contains my CV

3 Summary of Opinions

4 My overall opinions in relation the need for the MRL extension are provided at page 26 of the Specialist Report. I have not materially changed my opinions and have provided a summary of them here drawing directly from the report.

5 Firstly, the MRL has been identified in the SWRRIP, the 2013 MWRRSP, and the 2015 Draft MWRRIP¹, as having a key regional role. The facility has a remaining life potentially in excess of 50 years, depending on quarry extraction and the rate of waste acceptance following permitting of landfill extensions. It is also identified as a key location in the 'hub

¹ The 2015 Draft Implementation Plan is now effectively the "operative" waste plan for metropolitan Melbourne, although it remains in Draft.

and spoke' model, provided that future use is well planned, and the landfill operation is well managed, such that performance aligns with community expectations.

- 6 Secondly, there is a clear, demonstrable need for the extension of the MRL due to the forecast closure of the number of landfills currently servicing the south east waste catchment, namely the Fraser Road and Clayton Regional Landfills within the next four years, and the two SUEZ landfills at Hallam Road and Lyndhurst in the next 20-25 years. When the closure of these landfills is considered alongside the known lack of available and suitable locations for new putrescible landfills either in or close to the current south east waste region, there inevitably will be a significant increase in waste volumes needing to be diverted to the northwest Melbourne landfills.
- 7 As described (in the Specialist Report), prudent, conservative provision of future landfill capacity to meet the needs of metropolitan Melbourne underpins an essential public service, which in the future is demonstrably reliant to a significant extent on the availability of landfill capacity at the MRL. The 7-10 years of remaining licenced capacity at MRL is a relatively brief time-span in landfill terms, with such facilities often planned and developed for much longer periods in order to underpin their commercial viability and provide reasonable whole of life economics.
- 8 The 2015 (Draft) MWRRIP has a stated operating horizon of 10 years, but also needs to align with the SWRRIP in planning for waste infrastructure over a 30 year horizon. At this point the 2015 MWRRIP is not definitive in terms of how future landfill airspace (particularly Type 2 landfill capacity), will be provided to meet forecast demand. The Plan is quite broad in its approach to assessing how long term landfill capacity needs will be met and is reliant on a number of key assumptions in determining landfill airspace demand. If the waste generation or diversion forecasts included in the SWRRIP and integrated into the 2015 MWRRIP ultimately prove to be low, then the provision of adequate future landfill airspace could quite quickly develop into an acute problem for metropolitan Melbourne.
- 9 Applying now for planning and works approval for extension of the MRL, some 10 years before the site would otherwise need to close, is therefore appropriate in the context of the governing waste planning hierarchy for metropolitan Melbourne as it allows adequate time to for:
 - The Licensing process;
 - Detailed planning, design and construction of the extension;
 - Integration of plans for the facility [which is of state-wide significance] within other land use development planning for the area; and

- Pre-planning of quarry void development by the quarry operator.
- 10 Confirming the availability of future airspace at MRL through the planning permit process builds in the capacity to account for potential error in current forecasts by providing additional landfill capacity as a buffer. Confirmation of significant future landfill airspace at MRL will provide an increased degree of certainty to the authorities responsible for ensuring future landfill airspace is available to service metropolitan Melbourne's future landfill needs. All relevant waste planning documents are based on the continued development of the MRL, which is a facility identified as pivotal to the state-wide waste management strategy over the next 30 or more years.
- 11 The proposed extension of MRL, provided it is well managed and appropriately developed in accordance with usual planning requirements, is consistent with both state-level and metropolitan strategic waste plans (the SWRRIP and 2015 MWRRIP) that collectively aim to retain existing landfill sites with adequate buffers. Key reasons for this are:
- The inevitability of significant long term demand for landfill airspace close to metropolitan Melbourne;
 - The established use of the MRL site for landfill purposes, the developed infrastructure and the recognised status of the site in the relevant planning documents ;
 - The favourable location of the MRL in relation to the sources of waste, particularly when assessed against the changing landscape of landfill airspace availability in metropolitan Melbourne;
 - The favourable access routes that MRL has, with bulk haulage to the site confined largely to primary regional highways;
 - The inherent development flexibility that the MRL offers, with the ability to adjust to changes to Melbourne's future landfill disposal needs over time;
 - The significant airspace (volume) potentially available at the site – this represents a disposal resource of state-level significance and provides a high level of future-proofing for residual waste disposal in metropolitan Melbourne; and
 - The inherent uncertainty in the long term residual waste projections relied upon in the SWRRIP and the 2015 MWRRIP and hence the associated need to be conservative in relation to providing for the development of sufficient landfill airspace to meet the future needs of metropolitan Melbourne.
- 12 As I will comment on further under submissions, the role and views of the Metropolitan Waste and Resource Recovery Group (MWRRG) is key to the assessment of landfill need.

As set out in the MWRRG's website and other publications, one of the MWRRG's expanded legislative core functions is to develop a Metropolitan Waste and Resource Recovery Implementation Plan (Metropolitan Implementation Plan) that must align with the State Infrastructure Plan. This Metropolitan Implementation Plan (the current version of which is the 2015 Draft MWRRIP), sets out how the waste and resource recovery infrastructure needs of the greater metropolitan Melbourne region will be met over the next 10 years. It is a legislative requirement that the MWRRIP be consistent with government policies, including but not limited to land use planning and transport policies.

- 13 Key objectives of the MWRRIP are to ensure adequate provision for waste management and disposal with a primary time horizon of 10 years, but also considering the longer term. The MWRRIP needs to ensure the waste system is planned and coordinated in a way that supports community environmental objectives while bringing together state wide priorities (as set out in the State Infrastructure Plan) and applying them within the metropolitan context.

4 Further Research Since Advertising of the Applications

- 14 Not applicable.

5 Response to Submissions

- 15 I have read the submissions to the Applications that are relevant to my area of expertise.
- 16 There is nothing in those submissions that materially alters the information and opinions set out in the Specialist Report, or in this Statement of Expert Evidence. However, a number of the submissions warrant comment.
- 17 Where appropriate, I have addressed submissions individually. Where submissions have been more generic I have addressed them by grouping them according to the issues raised. Where possible I have referred to specific submitters, but in the case of public submitters, I have grouped these anonymously.
- 18 The three primary submissions in relation to need are from Brimbank City Council, the Metropolitan Waste and Resource Recovery Group, and Sustainability Victoria. Submissions were also received from private individuals (including a group titled as 'Stop the Tip', Stockland, Mt Atkinson Holdings Pty Ltd, and the Victorian Waste Management Association.

5.1 Brimbank City Council

19 There is nothing in the Brimbank City Council (BCC) submission challenging the fundamental “need” for the MRL extension. Most of the submission comprises explanatory and background comment and focusses on the requirement for the landfill to be constructed and operated in accordance with best practice so as to adequately manage potential environmental and amenity effects. The thrust of the submission is to seek to reduce the landfill’s scale, to have the development staged, with trigger points against a shorter planning horizon, and seek progressive approval for the extension. The submission confirms that the Council recognises the MRL and associated quarry have been identified as a hub of State significance.

5.2 Metropolitan Waste and Resource Recovery Group

20 In relation to providing future landfill disposal capacity for metropolitan Melbourne the authority responsible for planning and implementing to ensure Melbourne’s future waste infrastructure needs are met is the Metropolitan Waste and Resource Recovery Group (MWRRG). The MWRRG’s submission states:

‘The Ravenhall Site is a strategically significant waste and resource recovery infrastructure site of regional and state importance’.

21 The MWRRG submission sets out the background to arriving at the current 2015 Draft Metropolitan Waste and Resource Recovery Implementation Plan (2015 Draft MWRRIP). This Plan sets out what is actually planned for the next 10 years in relation to providing metropolitan Melbourne’s actual waste infrastructure and in this regard the submission states:

- ***The Ravenhall site has been considered a significant regional site in statutory waste plans since 1996.***
- ***When the site commenced landfilling in 1998, it was estimated that the site’s life was greater than 50 years².***
- ***When the site commenced landfilling in 1998 it was within the Urban Growth Boundary.***
- ***The site continues to be a strategically significant waste and resource recovery site for the greater metropolitan Melbourne region.***

² That is, likely to or beyond about 2050

- ***The Ravenhall Landfill is scheduled in the metropolitan landfill Schedule, which forms part of the 2009 Metropolitan Strategic Plan.....with a likely closure date post 2040 stated.***
- ***A reduction of the planned capacity of these hubs of state significance would be expected to impact the available capacity of the waste and resource recovery network serving metropolitan Melbourne.***
- ***The 2015 Consultation Draft Plan also makes clear that Melbourne is at risk of having inadequate landfill capacity to manage its current and projects waste volumes if this site does not continue its landfill operations into the long term.***

22 In summary the submission recognises that long term extension of the Ravenhall Landfill site has been anticipated since it commenced in 1996 and all associated statutory waste plans place a degree of reliance on this. The site is recognised as being well-located in relation to metropolitan Melbourne and as having a strategically significant role as a waste disposal and resource recovery hub out to around 2050, and potentially beyond that. This is critically important as the authority responsible is making in very clear that:

- The long term landfill capacity of the Ravenhall site has been recognised since coordinated waste planning began in the mid-1990s;
- All waste planning since has included consideration of that landfill airspace;
- Despite strong ongoing efforts to reduce residual waste to landfill, the demand for airspace will continue³;
- Replacing such capacity, if it is lost, may prove difficult and would in any event have a significant lead time; and
- The value of the site as a waste processing and recovery hub (alongside landfilling) is clear and is fundamental part of metropolitan Melbourne's planned future waste infrastructure.

23 It is clear from the legislative framework that the submission of the MWRRG should be given particular weight as this authority has a legal responsibility for planning and providing adequately for metropolitan Melbourne's future waste disposal and processing needs. As I have noted, the MWRRG submits that the Ravenhall Landfill site has been included in long term waste planning for the metropolitan Melbourne area essentially

³ As I have explained in the Specialist report, it may well increase

since formal waste planning commenced, and all current waste plans place a great deal of reliance on this putrescible waste disposal capacity being available to the Melbourne region.

5.3 Stockland

24 The Stockland submission essentially challenges the basis for what the authority responsible for planning regional waste infrastructure says (i.e., the Metropolitan Waste and Resource Recovery Group). I have already commented on the validity of the MWRRG's approach and hence I have not commented further on this submission.

5.4 Mt Atkinson Holdings Pty Ltd

25 The Mt Atkinson Holdings (MAH) submission claims that the application fails to 'provide a proper analysis of need' and that need is not assessed in relation to the longevity of the existing Boral quarry site.

26 My Specialist Report, supported by the relevant waste planning documents that have developed and been consulted on over the past decade or more, and as referred to in both my Specialist Report and the submission of the MWRRG, do clearly demonstrate both the need for and to an extent regional infrastructure reliance on the planned MRL extension.

5.5 Private Submitters including 'Stop the Tip'

27 Approximately 8 private individuals (some of whom have collated their submissions under a group named 'stop the Tip') have submitted on "Need". The submissions appear concerned mainly with the scale of the proposal and claim there is no demonstrable need at this time or within a reasonable planning horizon for a proposal of the scale set out in the Applications.

28 These submissions fail to recognise the extensive long term planning for the use of the site as a regional waste disposal and recovery hub, or the need for appropriate long term planning and approval. A long term view is needed to confirm a project such as the MRL extension, with its associated level of capital and commercial commitment. In my experience, most commercial landfills require development planning horizons of 30 or more years. When aftercare is considered, most significant landfill projects represent 50

year plus commitments on the part of the proponent. Such timeframes require a good deal of commercial certainty or development would never occur.

5.6 Victorian Waste Management Association

29 This submission, which appears to have been prepared by the Victorian Branch of the Waste Management Association of Australia⁴, simply supports the vital ongoing role of landfills as part of waste management infrastructure and supports the MWRRG's submission points noting that as stated in the Draft MWRRIP 2015:

'...if this site does not continue its landfill operations in the medium term (beyond the current 5-10 years of approved airspace), Melbourne is at risk of having inadequate landfill capacity to manage waste for which there is no current resource recovery alternatives.'

5.7 Sustainability Victoria

30 The Sustainability Victoria (SV) submission seeks and supports further efforts and initiatives to recovery waste or energy from disposal operations at the MRL site in the future. However, the submission also states in relation to new recycling and energy recovery initiatives:

'However, deployment of this technology in the sort to medium term is unlikely to significantly reduce current landfill needs proposed to be met by MRL in these applications.'

31 In other words, SV submits that while all involved in the waste industry need to continue to strive for improvements in resource efficiency, prudent planning for future residual waste disposal needs remains a necessity.

⁴ I note here that I am the national Vice President of WMAA, but was not involved in any way in the preparation of the Victorian branch submission in relation to this matter.

6 Declaration

32 I have made all the inquiries that I believe are desirable and appropriate, and no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel.



Anthony Kortegast

14 September 2016

Appendix A: Summary of Experience

My formal qualifications are BSc, BE (Hons), MEnvEngSc (UNSW). I am a Fellow of the Institute of Professional Engineers both in Australia and New Zealand, and I am a registered professional engineer (CPEng and Int PE).

I am an environmental engineer, with a career specialisation in landfill, environmental and industrial engineering. I am an accredited EPA Environmental Auditor (Industrial Facilities) in Victoria.

My experience in the solid waste field spans almost 30 years and covers the design and construction of landfills, waste transfer stations, hazardous waste containment facilities, compost facilities, industrial waste fills, and recycling and materials recovery facilities. These include some of the largest and most modern landfills in the Asia-Pacific region, such as the award-winning Redvale, Silverstream and Kate Valley landfills in New Zealand, and the Bukit Tagar mega-landfill in Malaysia which has a capacity in excess of 200 million tonnes of waste.

I have been involved with all aspects of landfill development and licensing, operations, lateral and vertical extension, closure and aftercare. I have carried many projects related to waste facility waste planning and disposal economics, as well as landfill and waste facility concept planning, through to detailed design and peer review. Altogether I have been involved with more than 150 significant waste projects throughout Australia and New Zealand, as well as with landfill and solid waste projects in Malaysia, the Philippines, Tuvalu, Fiji, Hong Kong and Vietnam.

I have acted as a guest lecturer in solid waste and landfill engineering at the Universities of Auckland and Canterbury and I have authored a number of technical papers in the field of solid waste and landfill engineering (refer CV). Over my career I have visited solid and liquid waste treatment facilities throughout Europe, the USA, Australia, the Pacific Islands, New Zealand and Asia, including a large number of both conventional and specialist solid inert, putrescible and industrial landfills, Materials Recovery Facilities and compost facilities. I have visited many of the world's large, 'reference' waste facilities and hence have a good understanding of international "benchmarks" in terms of landfill design and operation.

In Australia I have worked on landfill and waste projects for more than 15 years and have provided design, environmental audit and strategic advice in relation to landfills in Western Australia, South Australia, New South Wales, Queensland, and Victoria.

In New Zealand, I was the principal designer or principal reviewer for more than 20 significant landfill developments, and I have been involved in consent reviews, design, or advisory roles for

many others. I have assisted the NZ Ministry for the Environment (MfE) with the preparation of key landfill technical publications, acting as principal author for the revised design section of the Centre for Advanced Engineering 2000 Landfill Guidelines (CAE Guidelines) and I was the designer of the Landfill Full Cost Accounting model that has been adopted in New Zealand, and that internationally is now used and referenced widely using the internet.

I have been involved in a number of projects where I have assessed the regional need aspects of particular landfill proposals. These include the landfill projects at Redvale and Whitford – two of 3 strategic landfills in Auckland. I have also been responsible for the assessment of need and the related development issues for landfills at Whangarei, Kaitaia, Wellington (Silverstream and Porirua), Christchurch (Kate Valley), Timaru and Dunedin – all now key aspects of New Zealand's regional waste infrastructure. I also undertook similar studies assessing waste sources and waste forecasting in relation to the Bukit Tagar landfill in Kuala Lumpur where the source population base exceeded 5 million people.

I have particular knowledge of the MRL site as I was retained as the Landfill Operations Auditor and in 2013 and 2014 I prepared two environmental audit reports for the site under s53V of the Environment Protection Act, 1970.

A copy of the instructions I received from NRF are included as Appendix D. NRF also provided me with a copy of the Planning Panels Victoria "Guide to Expert Evidence" and I prepared this Statement in accordance with it.

Appendix B: CV

Tony Kortegast – Project Director

Tony has extensive consent and environmental court experience and is known for his industry expertise, consultation skills, design expertise and strategic thinking. He is Managing Director of Tonkin & Taylor International division and regional business entities, with a total of staff of some 600 people.

Tony has more than 30 years national and international experience in environmental and solid waste engineering. His work covers the whole range of project inputs from concept development and public and consent processes, to detailed design and construction management.

Tony is at the forefront of solid waste engineering in New Zealand. With work experience in more than a dozen countries, he has provided specialist services to public and private sector clients as well as Asian Development Bank, World Bank, UNCHS (Habitat), UNDP, NZMfE and NZ Aid. He has authored more than 20 technical papers and lectures and is currently the convenor for the landfill Technical Working Group for WasteMINZ and is the Australasian contributor to the ISWA International Landfill Working Group.



Expertise

Core competencies include:

- Environmental auditing, municipal solid waste, water and wastewater treatment, landfill design and construction, landfill operations, landfill gas management, closed landfill remediation and redevelopment, environmental risk assessment, financial assurance planning and modelling for landfills and hazardous waste facilities, chemical/industrial wastes, geohydrology, consent processes, developing country waste management planning and training, project management.
- Mediation processes related to consents and contract management, audit processes,
- Engineer to Contract, contract management, expert witness.
- Peer review and VCAT evidence in relation to proposed solid inert landfill in an existing quarry operation, Sunshine, Victoria
- EPA liaison in relation to several closed landfill sites, Heatherton, Victoria
- Expert support in relation to peer review of landfill re-development, Victoria
- Technical expert for review of landfill litigation proceedings, High Court, Victoria.
- Project Director and technical reviewer for closure activity at 30 former service station sites in Victoria, Southern NSW and Tasmania.

Current 53V Audits

- TWM Brooklyn Landfill closure and capping VCAR
- Grosvenor Lodge – Cell 3A, 3B sidewall liner CAR

Completed 53V Audits

- TWM – Carroll Road, Stage 5 – Cell 1 (upper) – CAR Addendum
- Sunshine Groupe - Bunting Road Cell 5 CAR
- City of Greater Geelong - Drysdale Landfill, Operational 53V audit
- Boral - Deer Park Landfill, Operational 53V audits 2012, 2014

Experience

Examples of relevant projects:

Expert Support and litigation Roles – Australia

- Expert review and VCAT evidence in relation to a proposed quarry expansion in western Victoria
- Expert review Class IV private sector landfill development in Western Australia

- Transpacific Waste Management (TWM) - Tullamarine Landfill, Mounds 1 & 2 cap construction audit
 - TWM – Fraser Road Waste Landfill, Cell 5C-2 – CAR
 - TWM – Carroll Road, Stage 5 – Cell 1 – CAR
- Other Audit Roles & EMS Auditor Inputs
- Yarra Glen EMP Audit - Process and report review for a detailed EMS audit for VicRoads, against Contractor’s EMP. Audit tasks:
 - Review against VicRoads checklists for operations
 - Review of EMP Checklist
 - Site inspection and assessment of practical compliance with EMP
 - Cut and fill EMP compliance review reporting
 - Springvale Bypass EMP Audit - Process and report review for a detailed EMS audit for VicRoads, against Contractor’s EMP. Audit tasks:
 - Review against VicRoads checklists for operations
 - Review of EMP Checklist
 - Assessment of on-site compliance with EMP reporting
 - Review of findings related to audit of Total Petroleum Fiji operations aimed at ISO14001 awareness-raising, and preparation of a road map for development and implementation of an ISO14001 EMS.
 - EMS gap assessment for Vector Energy, Auckland.
 - Telarc laboratory auditor experience assessing NZS, AS and ASTM compliance of several registered soils laboratories for Telarc registration or reregistration.
- Audit Expert Support Roles
- Support to TWM – Henry Street Solid Inert Landfill, Heatherton
 - Cell 6-1 (South) –Construction Audit Report – (CAR)
 - Stage 4 Cell 2 – CAR
 - Stage 6-1 (North Wall) – CAR
 - Stage 4 Cell 2 (upper sidewall) – CAR
 - SITA Stevensons Rd Landfill – Cell 12B, Victoria 53V audit – technical reviews and technical overview of construction audit process as landfill expert
 - Theiss Services – Rochdale Landfill Cell 5A Development – Project Director and technical overview input on site to quality management of cell construction involving a geocomposite liner system and production of CQA report
 - Devilbend Solid Inert Landfill
 - Cell 3A – CAR
 - Cell 3B – CAR
 - Landfill 53V audit with a focus on groundwater impacts for Braithwaite St Landfill, Warranmbool, Victoria
 - Kilmany Landfill Cell 1 Extension – CAR
 - Hyland Landfill Cell 3 – CAR
 - Drysdale Landfill Audit Report, City of Greater Geelong, 2011 – Expert review, evaluation of leachate impacts, audit report review
 - Former Clarke Road Landfill, Heatherton – Project Director for Audit – format quantitative assessment of closed landfill cap quality, related BPEM compliance and environmental risk including assistance with preparation of Auditor report and discussions with EPA and third party auditor. Assessment of remedial options and related recommendations.
 - Pasmenco Smelter closure, Newcastle – expert support to W Ryall (Auditor, NSW) on all aspects of closure works, including an engineered waste containment cell and managing related amenity, groundwater and surface water protection works.
 - Incitec Pivot site closure, Newcastle – expert support to A Lau (Auditor, NSW) on proposed closure works and on-site landfill and containment cell design.
 - Camdenville Park Landfill closure, Sydney – Expert audit support in relation to DSI, SAQP, RAP and other related site closure documentation.
 - Proposed landfill extension, Sydney – analysis of viability of expansion of airspace envelope to create 5 Mm3 of additional void (client confidential).

- Bunting Road landfill, Brooklyn – design review and amendment to upgrade to a geocomposite liner design.
 - Trafalgar Landfill, Baw Baw Shire (TWM) – development of conceptual closure drainage concept, preparation of pre- and post-settlement contours, drainage attenuation structure design, and reporting.
 - Clarinda Landfill (TWM) – preparation of pre- and post-settlement contour plans for Licence approval.
 - Brooklyn Landfill (TWM, Victoria) – expert support to Auditor, review of cap drainage concepts, development of alternate cap drainage solutions, and EPA reporting.
 - Darwin and Howard Peninsula Strategic Waste Study – technical manager for landfill and waste facility siting and permit study (current).
 - Brooklyn Landfill, Victoria - advice on steep wall liner design options and construction methods.
 - Quarry re-development, Victoria (client confidential) - development of long term quarry redevelopment plans and cost model to enable permit preparation for a new landfill site featuring an innovative steep wall liner system.
- Director of Environmental Engineering, Tonkin & Taylor Ltd**
- Selected environmental and engineering assignments undertaken, include:
- Project Director and lead consultant roles for a range of landfill development and consent projects:
 - Silverstream Landfill Stage 2, Phase 1 development
 - Porirua Spicer Landfill extension
 - Oamaru Landfill Area D development
 - Oamaru Landfill Areas B, C investigation
 - Whitford Landfill Steep wall liner review
 - Baw Baw Sire (Trafalgar Landfill) stability review
 - Bluegums Landfill Stage 6 and LFG system development (Engineer to Contract)
 - NZ Steel Site 1 Landfill Development
 - Kate Valley Landfill future phasing study
 - Project Consultant with principal responsibility for the following design, CQA and other audit-like reports:
 - Kate Valley Stage 1A-1, 1A-2, 2A-1, 2C Design Reports
 - Kate Valley Stage 1A-1, 1A-2, 2A-1, 2C Construction Reports (essentially CQA Audit reports)
 - Waireka secure landfill performance assessment and environmental Bond formulation
 - Kate Valley Landfill performance bond development, including risk assessment
 - NZ Steel Site 1 Landfill Bond development and risk assessment
 - Principal author and project director for NZ Landfill Full Cost Accounting Model, 2004.
<http://mfe.govt.nz/publications/waste/landfill-full-cost-accounting-guidemar04/fce-gvide.pdf>
 - Landfill risk assessments and financial Bond formulation for the Redvale, Whitford, Kate Valley and Waireka landfills.
 - Team Leader and principal waste consultant for NZODA funded capacity building and review study for infrastructure development in the city of Thanh Hoa, Vietnam. Inputs included a review of local infrastructure planning for water supply, wastewater and solid waste, as well as urban design. Training was also developed and provided in solid waste infrastructure needs and options assessment.
 - Pacific Waste Sector CDM Project - Team Leader for the MfE strategic evaluation of potential CDM projects in the waste sector in the Pacific aimed at developing potential CDM project initiatives and identifying institutional constraints related to project implementation.
 - Waste Acquisition – Australia (client confidential) – detailed review of due diligence issues related to prescribed waste landfill facility, technical review and analysis and development of options and

- costings for long term facility management and closure.
- Management of UNDP institutional strengthening and water resources planning project, Papua New Guinea. Work included evaluation of water quality issues and sector-based industry and agricultural impacts in selected catchments, together with environmental and permit-related training and capacity building.
 - Hazardous Waste Facility Closure (client confidential) – Principal consultant for development of an environmental risk model for a closed chemical waste landfill and development of a related aftercare financial assurance model, together with negotiation of the structure of the financial assurance package.
 - Preparation of risk model for Whitford Landfill expansion (Footprint T) including assessment of seismic risk related to the Waikopua Fault and ongoing quarry operation.
 - Omarunui Landfill: Preparation of conceptual final grades and liner grades to combine existing partially filled Area A valley and proposed Area D. Together with hydrogeological assessment and consents for landfill expansion.
 - Project Director, Mindanao Critical Coastal Management Study for NZODA. (1998).
 - Design review of a commercial sewage treatment plant in relation to ammonia and total biological loadings, for Auckland City Council.
 - Lead engineering consultant for re-design and air discharge permit processes for Whitford Landfill and quarry for Waste Disposal Services Ltd.
 - Principal engineer and engineer to contract for Bluegums landfill liner failure investigation, design and reconstruction stages 2, 2a, 3, 4.
 - Development of consent discharge monitoring programme and discharge plume modelling field studies for ocean discharges from a 150MW gas-fired thermal power station, New Plymouth, for ECNZ (1994).
 - Project Director for NZMfE project to develop hazardous waste guidelines and waste screening procedures for New Zealand.
 - Project Manager for evaluation of hazardous waste disposal options for a major pulp and paper mill complex. Work involved evaluation of waste streams, review of existing disposal sites and development of waste treatment and disposal options (2002).
 - Project Director for design and construction of two 6 ha polishing wetlands utilising HDPE liner, Tauranga (1997).
 - Project Director for \$45m SH20 motorway design and construction project, Auckland. Work included 7 km highway, four major bridges and ancillary works (1997-1998).
- Industrial Waste Management and Waste Minimisation
Project Director/Technical author for preparation of the NZ Resource Recovery Park
Guide <http://wasteminz.org.nz/The-NZ-Resource-Recovery-Park-Design-Guide-June-2008.pdf>
- Waste Specialist for development of solid waste masterplan for the Thu Thiem urban redevelopment project in south east Ho Chi Minh City for Sasaki Associates and Parsons Brinkerhoff International. Responsible for all aspects of waste system concept planning, economic and feasibility assessments, and system design (ongoing).
 - Team Leader, Principal Consultant and Trainer for preparation of a solid waste master plan and development of pilot composting plant technology for the city of Hanoi, Vietnam (population 3 million) for United Nations Development Programme. Work included development of solid waste masterplan and strategic assessment of future waste disposal facility needs.
 - Landfill Specialist for a preliminary regional landfill siting study in the Bandar Seri Begawan area of Brunei for a private consortium.
 - Team Leader, Principal Consultant, Course Developer and Trainer for NZODA funded capacity building in solid waste management and landfill

- siting and design, Hanoi where some 30 participants from Hanoi and surrounding provinces were trained in waste disposal technology over a period of 1 month.
- ADB AOTA 4214: Effective Solid Waste Management and Recycling in Tuvalu - Team leader over an 18 month TA to assess, plan and implement solid waste system improvements in Tuvalu. Key issues include planning, training and community processes related to solid waste collection, waste separation, compositing and disposal. Recycling options were examined in detail as were waste minimisation and waste re-use options. Landfill upgrading and management training were undertaken along with a comprehensive solid waste-planning programme. Total input 3.5 mm.
 - Preparation of bid documentation for new regional strategic waste project for the City of Guangzhou, China for private bid consortium.
 - Review of strategic landfill, expansion and related development issues for major Hong Kong landfill, 2006 (client confidential).
 - Project Director for regional waste study and landfill siting and design programme for Batangas Province, Philippines (2001). Work involved a waste stream assessment, assessing siting restrictions and protocols, site selection and concept design.
 - Bukit Tagar Landfill, Kuala Lumpur - Project Director responsible for concept development, engineering design and financial assessment of a 150 M m³ mega-landfill to service the city of Kuala Lumpur and the Klang Valley region of Malaysia, with a design waste input of 4500 tpd.
 - Whangae Landfill – Project Manager for landfill consent and closure programme involving consent review, AEE and consent applications, closure works, design and capping assessment.
 - CHBDC Farm Road Landfill – Landfill Engineer responsible for landfill management overview, expansion option development and related consent and engineering programmes.
 - Provision of project scoping and preliminary design inputs for Puchong landfill, Kuala Lumpur as a sub-consultant to Waste Management Incorporated, UK.
 - Lead engineering consultant for the location study, consent processes and design for 13Mm³ Canterbury Regional Landfill (1999 - ongoing).
 - Design review and strategy development for ongoing works and upgrading for 10 Mm³ Silverstream Landfill, Wellington for Hutt City Council (1998).
 - Initial concept review and consent assessment, Wainuiomata Landfill, Wellington, for Hutt City Council.
 - Landfill siting options review and financial modelling of disposal options for Far North District Council.
 - Engineering and consent advice in relation to upgrade and extension of Hunua Gorge Landfill for Manco Ltd.
 - Lead engineering consultant for siting, design and consent processes for Puwera Landfill, Whangarei for Whangarei District Council (1997 – ongoing).
 - Development of technical training programmes in landfill technology for the NZ Government and provision of in-country seminars related to solid waste management, landfill siting, appropriate technology and construction in northern Vietnam. Environmental Management Systems
 - Kate Valley Landfill – Development of environmental risk model, contingent risk costs, closure costs, and aftercare requirements and costs, together with preparation of a financial assurance model for this newly commissioned regional landfill.
 - Naboro Landfill, Suva – Project Manager for review of management and operations contract, environmental management plan – in particular leachate management impacts, leachate management proposals and general site management.
 - Whitford Landfill Expansion, Project Director/Technical Manager for proposed 6 Mm³ expansion of landfill into quarry void. Work included

planning and coordination of groundwater, engineering, phasing, liner and final closure/landscape assessments. Preparation of concept designs and related design report and consent applications.

- Management of consent process and EIA preparation for a major sewage sludge and greenwaste composting plant, Wellington (1998).
- Technical reviewer and advisor for the development of the Taranaki regional solid waste strategy, 2003.
- Preparation of early closure scenarios and related risk profiles (landslide, earthquake, other) for Redvale Landfill, Auckland. Development of remediation options and related costs and formulation of financial bond model for ARC and RDC approval to cover contingent events and early closure.
- External review/auditor for financial model and bond fund for Waste Management NZ Ltd, Redvale Landfill. Following on from the bond formulation work, this role is as an independent assessor of the scope and adequacy of internal cost allocation, risk profiles and ongoing bond provision.
- Organochlorine landfill risk assessment (client confidential). Preparation of long-term landfill performance and risk profile. Quantitative assessment of facility risk and security and recommendations related to long-term management options and costs.
- Preparation of development risk model for the proposed Silverstream Landfill expansion with a focus on amenity management, seismic stability and risk and development of contingency plans, as well as formulation of specific design elements to address seismic and groundwater risk contamination and preparation of cost models for these scenarios.
- Preparation of financial and landfill aftercare funding models for several major landfills including Puwera, Bluegums, Bukit Tagar (Malaysia).
- Principal author/designer of the MfE Landfill Full Cost Accounting Guide.

- Preparation of preliminary risk model related to the Kate Valley site including issues such as seismic profile/risk, groundwater contamination risk and contingent events.
- Omarunui Landfill: Preparation of conceptual final grades and liner grades to combine existing partially filled Area A valley and proposed Area D. Together with hydrogeological assessment and consents for landfill expansion.
- CAE Guidelines: Task group member and technical author for the preparation of the revised Landfill Guidelines document published by CAE in April 2000 – responsible for the Landfill Siting and Design sections and peer review of the document.

Senior Geo-Environmental Engineer

- Evaluation of two existing municipal waste dumps, an asbestos dump and several ash dump areas and design of closure and environmental mitigation measures, for ECNZ, New Zealand.
- Review of the hydrogeology of the Las Pinas area, Manila, Philippines, in a study for Rohm and Haas on groundwater contamination.
- Investigation, design of remedial works and supervision of a M\$1.5 site rehabilitation programme, for a chemically contaminated industrial site, Auckland, New Zealand.
- Hydrogeology review, field investigations, seepage analysis and detailed design for tailings impoundment and embankment underdrainage systems, together with review of leachate chemistry, design of laboratory test programme, analysis and reporting on drainage and construction material durability for Cyprus, Golden Cross Goldmining Project, Waihi, New Zealand.
- Project Manager for surface and groundwater hydrological investigation of the Chatham Islands peat deposits (15000 ha) for the Liquid Fuels Trust Board. Work involved surface hydrology network setup, surface and groundwater quality monitoring and evaluation, peat system hydrogeology evaluation, and reporting in relation to resource development.

- Hydrogeological investigations review of village well and sanitation systems, well design, infiltration gallery design and reporting on two 50,000 ha water supply schemes in the Tenghilan and Kemabong areas of Sabah, East Malaysia.
 - Hydrogeological review and assessment of shallow wellfield capacity and water quality issues for new water supply assessment at DB Central Brewery, Maingatainoka.
 - Programme Manager for hydrogeological investigation, analysis and computer modelling of nitrate and ammonia contamination of groundwater, Taranaki. Responsible for the design of groundwater contamination mitigation and monitoring programmes.
 - Project Manager for hydrogeological investigation, analysis, and reporting on groundwater contamination for a major industrial site, South Auckland.
 - Hydrogeological investigation, modelling and recommendations on remedial drainage works for a 35,000 irrigation scheme at Waiau, North Canterbury.
 - Design of site investigation programme, groundwater monitoring and chemical testing to locate buried water dumps for an industrial site in Auckland. Design of contamination mitigation programme, waste recovery procedures and final disposal.
 - Manager for surface water studies, analysis and reporting for opencast mining pre-feasibility/site ranking studies for three major lignite deposits in the South island, N.Z. Work involved design of sampling network, sampling programme management, data analysis and reporting.
 - Design of 40,000 m³ capacity anaerobic waste stream treatment lagoons for AFFCO Ltd, Whangarei including water right and seepage assessments.
 - Assessment of industrial contamination problems for several major industrial sites including evaluation of environmental impacts from heavy metals and timber treatment chemicals.
- Industrial Waste Management and Waste Minimisation
- Evaluation of leaking chemical waste site and design of mitigation measures, Waikato (client confidential).
 - Evaluation of containment options and development of the design for a secure waste containment cell for disposal of 14,000 tonnes of pre-treated chemical processing waste, New Zealand.
 - Site selection studies and design of a 1mm³ sanitary landfill including site investigation, geohydrological studies and consent processes, Central Hawkes Bay, New Zealand.
 - Regional site selection studies and feasibility design of a 12mm³ solid waste landfill, New Zealand.
 - Design review, subconsultant co-ordination and preparation of development proposals and water right applications for an 80 ha, 21m m³ sanitary landfill for Waste Management Ltd. Work included all aspects of preliminary design, leading into final design detailing, together with preparation of all engineering, amenity management assessment, monitoring plan development and related evidentiary material and provision of expert witness on landfill design and construction (1985-1991).
 - Hydrogeology review and preparation of evidence for tribunal hearings related to a proposed 15 mm³ sanitary landfill at Peach Hill, Drury.
 - Engineering site selection, design of engineering works and leachate control measures for a 6mm³ industrial waste fill, N.Z. Steel Ltd, Glenbrook. Work included waste stream analysis, design of landfill layouts, preparation of a landfill management plan, design of surface water and groundwater protection measures and preparation of water right documentation.
 - Project Director for a number of landfill closure studies including Barrys Point Landfill, 85 closed landfill sites for Auckland City Council and several closed sites in the Wellington Region.

Environmental Management Systems

Preparation of management plans for several landfills and for preparation of and comment on technical management guidelines for clean waste fill operations in the Auckland Region.

Geotechnics Ltd - QA/QC Contract Manager, Marsden Point Refinery Expansion Project

- Responsible for on-site management of a \$2.5m engineering and testing contract. Work included specialist engineering advice and provision of investigation and testing services for materials, foundations and groundwater contamination problems. This included specialist input on exploration, testing and construction of 30 m deep bentonite - cement groundwater cutoff walls and dewatering product recovery measures.
- Responsible for detailed investigations into petrochemical seepage into underground structures including all aspects of safety procedures and permitting both within the operating refinery and on the expansion site.
- Design and operation of petroleum recovery system and monitoring procedures.
- Responsible for the subcontract administration and direct supervision of up to twenty scientists and technicians. Responsible for the programme of laboratory preparation leading to TELARC registration of the site laboratory.

Civil/Materials Engineer – Tonkin & Taylor Ltd

- Responsible for the detailed on-site management of the \$6M site development contract relating to the expansion of the N.Z. Steel Mill at Glenbrook. Responsible for all construction supervision, and for the direction of 8 staff involved in technical aspects of contract management. Work supervised under this contract included 1 Mm3 cut/fill, extensive drainage, armco culverts, concrete box culvert construction, and construction of heavy duty roads, rail formations and hard-standing areas. Responsible for claims preparation and checking, contractor co-ordination, site safety, environmental management, and design change processes.

- Telarc Laboratory audit assessment responsible for compliance and system audits for a number of civil engineering testing laboratories throughout New Zealand.

Geotechnical Engineer – Tonkin & Taylor Ltd

- Direction of investigation, laboratory testing programme, material resource evaluation and geotechnical appraisal for water supply reservoir projects at Te Marua (Wellington) and Maitai (Nelson).
- Planning and supervision of installation of instrumentation for the Vaturu Dam, Fiji. Training of local technician staff in long term monitoring techniques.
- Design of hydraulic structures for the Kerikeri Irrigation Scheme, New Zealand, including spillways, weirs and intakes.
- Responsible for the supervision and quality control testing of earthworks and construction monitoring of settlement of a 5000 tonne fuel tank for BP (N.Z.) Ltd.
- Geotechnical investigations for the Aniwhenua Hydroelectric Scheme, Bay of Plenty including supervision of comprehensive laboratory testing of cement treated ash for canal lining including stress/strain and strength measurements, weathering resistance and freeze/thaw tests to USBR methods, scale tests on erosion properties and the evaluation and reporting on test results.
- Civil works design for a \$0.5 m site development contract for Nissan Datsun at Wiri.
- Investigation for Waipori Falls powerhouse, Whangarei Port Development, Fergusson Wharf Extension and Reserve Bank Building.

Field Engineer/Technician - Geotechnics Ltd

- Responsible for supervision of technician and drilling staff and planning and direction of field investigation and laboratory testing programmes. Field assignments include the supervision and testing for several industrial site development contracts and the control of various site investigations throughout the North and South

Islands. Wide experience in many special types of field testing procedures including downhole permeability, well testing, Menard pressuremeter and nuclear density methods. Organisation of pile driving contracts, pile load testing and plate bearing tests.

- Extensive soils laboratory testing experience.

Qualifications

BSc, (Geology) (University of Auckland)

BE (Hons), Civil (University of Auckland)

Master of Environmental Eng. Sc. (UNSW)

CoP MSc Course, Public Health Engineering

NZIM Advanced Executive Programme 1995

APESA Short Course on Risk Management 1998

Contract Management and Legal Aspects of Contracts (IPENZ) 1999

EMS Auditor Training 2011

Proteus Leadership Programme, London University, 2011

Memberships

- Fellow, Institute of Engineers Australia
- Fellow, Institute of Professional Engineers, New Zealand
- Environmental Auditor – Industrial Facilities, Victoria (appointed until Dec 2018)
- Chartered Professional Engineer
- Registered International Professional Engineer
- Member, N.Z. Geotechnical Society
- National Vice President & member, Waste Management Association of Australia
- Life Member, Waste Management Institute of NZ (WasteMINZ)
- Member, Institute of Water and Environmental Management
- Member, Solid Waste Association of North America (SWANA)
- Member, International Solid Waste Association (ISWA)
- Member, Australian Institute of Company Directors

- Member, NZ Institute of Directors.

Publications

1. Eldridge S., Kortegast A.P., Bryce A., Peng S.F., *Key Considerations in Developing Effective Leachate Management Strategies*, WMAA 5th Landfill & Transfer Station Conference, Gold Coast, 2013.
2. Kortegast A.P., Shallard A., Eldridge S., Bryce A., Kavazanjian Jr E., *Landfill Cap Design for Runoff and Infiltration Control – An Innovative Solution*, ISWA World Congress, Florence 2011.
3. Eldridge S., Kortegast A.P.K., *Steep Wall Liner Systems*, WMAA Landfill Symposium, Adelaide 2011
4. Eldridge S., Eldridge J.J., Kortegast A.P., *Steep Wall Liner System Design*, Twelfth International Waste Management and Landfill Symposium, Sardinia, October 2009.
5. Eldridge S., Simpson J.M., Kortegast A.P., *Potential for Clean Development Mechanism and Voluntary Emission Reduction Projects within the Waste Sector in South Pacific Nations*, Twelfth International Waste Management and Landfill Symposium, Sardinia, October 2009.
6. Kortegast A. P., Eldridge S., Richards B.A., Yong S., Chock E., Bryce. A., Robinson H., Carville M., *The Bukit Tagar Sanitary Landfill, Malaysia – A Successful Model*, Proceedings of the ISWA World Congress, Singapore, November 2008.
7. Kortegast A.P., Eldridge S., Richards B., Yong S., Chock E., Bryce. A., Robinson H., Carville M., *Leachate Generation Analysis and Treatment at the Bukit Tagar Landfill, Malaysia*, Proceedings of the International Solid Waste Symposium, Sardinia, October 2007.
8. Eldridge J.J., Knox K., Chock E.T., Eldridge S., Richards B.A., Kortegast A.P., *Leachate*

- Management Strategies at Large Tropical Landfills – A Case Study*, Proceedings of the International Solid Waste Symposium, Sardinia, October 2007.
9. Kavazanjian, E. Jr., Dixon N., Katsumi T., Kortegast A.P., Legg P., Zanzinger H., *The Performance of Geosynthetic Barrier Systems for Landfills*, Keynote Paper to the 6th IGC International Conference on Geosynthetics, Yokohama 2006.
 10. Kortegast A.P, Amputch A.R., Pinkham M., 2004; *Achieving a Regional Waste Disposal Solution – the Path to Opening Kate Valley Landfill*, Proceedings of Waste MINZ 2004 Conference, Auckland.
 11. Kortegast A.P, Amputch A.R., Purchas C., 2003; *The MfE Landfill Full Cost Accounting Model – A Key Tool For Landfill Management*, Proceedings of the International Solid Waste Symposium, Sardinia, November 2003.
 12. Kortegast A.P, Khire M.V, Rollan R.R, 2000; *Key Success Factors for Solid Waste Disposal Projects in the Philippines*, IWEM Conference on Waste Disposal in Asia, Manila, November 2000.
 13. Kortegast A.P, Amputch A.R, Khire M.V, 1999; *Financial Modelling for Landfill Management*, Proceedings of Waste MINZ Conference, Queenstown 1999
 14. Khire M.V, Kortegast A.P, Amputch A.R, *Field Data and Modelling of Leachate Generation Rates for Landfills*, Proceedings of WMINZ Conference, 1999.

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