Form A (version 2)

INDIVIDUAL EXPERT REPORT OF ROWENA SALMON
CONTAMINATION AND WASTE MANAGEMENT
4 AUGUST 2016

COURT DETAILS

Court	Land and Environment Court of New South Wales
Class	1
Case number	2016/159652 (Formerly 2015/10898)

TITLE OF PROCEEDINGS

PROCEEDINGS 2016/159652 (Formerly 2015/10898)

Applicant	**Liverpool City Council**
First Respondent	**Moorebank Recyclers Pty Limited**
Second respondent	**Minister for Planning**

PROCEEDINGS 2016/157848 (Formerly 2015/10951)

First applicant	**Benedict Industries Pty Limited**
Second applicant	**Tanlane Pty Limited**
First Respondent	**Minister for Planning**
Second respondent	**Moorebank Recyclers Pty Limited**

PREPARATION DETAILS

Prepared for	**Liverpool City Council**, applicant
Legal representative	Chris Shaw, Swaab Attorneys
Legal representative reference	151403:CHS:TMS
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Intended for

Liverpool City Council c/o Swaab Attorneys

Date

August 2016

Project Number

AS121936

EXPERT REPORT, CONTAMINATION AND WASTE MANAGEMENT

LIVERPOOL CITY COUNCIL V MOOREBANK RECYCLERS PTY LTD AND MINISTER FOR PLANNING, NSW LEC 2016/159652

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ENVIRONMENT
& HEALTH

4 August 2016

Liverpool City Council c/o Swaab Attorneys

Attn: Chris Shaw and Theresa Sukkar
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Sydney NSW 2000

Sent via Email: chs@swaab.com.au
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cc: Nicholas Mark – npm@swaab.com.au

Dear Chris and Theresa,

Expert Report, Contamination and Waste Management

Liverpool City Council v Moorebank Recyclers Pty Ltd and Minister for Planning, NSW LEC 2016/159652

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Ref AS121936

I have pleasure in submitting this expert report in relation to the proposed Moorebank Waste Recycling Facility at Newbridge Road, Moorebank.

The report was commissioned by Swaab Attorneys on behalf of Liverpool City Council to provide my opinion on contamination and waste management issues associated with the project which is proposed by Moorebank Recyclers Pty Ltd.

Thank you for giving me the opportunity to conduct this review. Please call me on 9954 8100 if you have any questions.

Yours faithfully
Ramboll Environ Australia Pty Ltd

Rowena Salmon
Senior Manager, Environmental Engineer MIEAust

Ramboll Environ Australia Pty Ltd
ACN 095 437 442
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APPENDICES

1. EXECUTIVE SUMMARY

1. I have undertaken a review on behalf of Liverpool City Council of contamination and waste management issues in relation to the proposed Moorebank Waste Recycling Facility at Newbridge Road, Moorebank.
2. In my review I have relied on a number of historical reports in addition to recent documentation prepared by Environmental Resources Management Australia and specifically Sophie Wood, the contamination and waste management expert on behalf of Moorebank Recyclers Pty Ltd. I have also undertaken a site visit in December 2015. The recent works (2016) have provided substantial additional information that was not included in the development submission and have allowed for a more informed consideration of the issues.
3. The key contamination and waste management issues that are outstanding in relation to the proposed development are:
   a) Additional investigation is required for the presence of asbestos in current capping materials to determine their suitability for reuse as capping in the development areas. If the current capping is not suitable for reuse this may affect the viability of the project therefore assessment of the current cap for asbestos is recommended prior to development consent being granted.
   b) Clearance of surface asbestos identified at the site is required prior to the works commencing. The requirement for surface asbestos clearance would be suitable to be made a condition of the development consent.
   c) Provision of outstanding design details are required, including in relation to: the perimeter noise bunds/ mounds (including the proposed waste component); landfill gas protection measures for buildings; and contingency leachate management. Confirmation of the proposed capping for the entire landfill area is also required. These details are required prior to development consent being granted and should be approved by a Site Auditor to confirm that the site can be made suitable for the intended use. If consideration of site suitability is undertaken at completion of the bulk earthworks (as per the current approval conditions), issues may be identified at that time and additional works may be required that may not be able to be incorporated into the proposed development.
   d) Preparation of an environmental management plan is required for the earthworks, including an asbestos management plan and details of leachate de-watering, treatment and disposal. These details are required prior to development consent being granted and should be approved by a Site Auditor to confirm that controls for the protection of human health and the environment will be adequate during the earthworks. The potential human health and environmental impacts of the earthworks are significant in nature and detail on how such impacts will be prevented should therefore be provided before development consent is granted.
   e) A draft operations environmental management plan has been prepared by Environmental Resources Management Australia. Implementation of a long term (operations) environmental management plan is appropriate and is required to comply with the 2001 Site Audit Statement. A Site Audit would be required to determine the ongoing suitability of the site for its intended use, subject to implementation of the environmental management plan. The requirement for implementation of an operations environmental management plan would be suitable to be made a condition of the development consent. The requirement for a Site Audit to be conducted following completion of the development, to confirm the suitability of the site and approve the ongoing management and monitoring measures, should also be made a condition of the development consent.

f) Since the works take place on a landfill - a known contaminated site - a remedial action plan should be prepared to describe the proposed earthworks, landfill capping, landfill gas protection measures and leachate management. Detailing of environmental management plan measures during earthworks would have been a requirement of a remedial action plan, as would many of the other aspects for which consideration was lacking in the application and is required for assessment of the suitability of the development with respect to contamination and waste management issues. Preparation of a remedial action plan and approval by a Site Auditor is recommended prior to development consent being granted.

2. INTRODUCTION

4. I have been asked by Swaab Attorneys on behalf of Liverpool City Council (**Council**) to provide my opinion on contaminated land issues in relation to the proposed Moorebank Waste Recycling Facility (**the Project**) at Newbridge Road, Moorebank (**the Site**). I was engaged to commence my review in November 2015. A copy of my Letter or Instruction is included in Annexure 1. Given the site is a historical landfill, many of the contamination issues overlap with waste management issues and therefore I have considered both of these areas in my review. I note that Andrew Kosciuszko is also advising Council in relation to specific waste management issues outside my area of expertise
5. My opinion documented herein is based on the following scope of works:
   a) Review of documents listed in Section 4, following.
   b) A site visit on 7 December 2015.
   c) Conference on 1 July 2016 with Sophie Wood acting on behalf of Moorebank Recyclers Pty Ltd and Andrew Kosciuszko acting on behalf of Council.
6. I have structured my opinion around the Amended Statement of Facts and Contentions (**SOFAC**) filed on behalf of Council on 24 June 2016. The relevant Contentions and Particulars are reproduced and further supporting information is provided in Sections 6 and 7 of my report, for Contamination issues (Contention 11) and Waste Management issues (Contention 12), respectively. Section 5 provides my summary of the history of works and key findings in relation to contamination and waste management at the site, based on the scope of works listed in paragraph 5 above.

3. QUALIFICATIONS AND EXPERT WITNESS CODE OF CONDUCT

7. A copy of my curriculum vitae is included in Annexure 2. This identifies my qualifications and summarises my experience in the assessment and remediation of contaminated land, including numerous landfill sites.
8. I confirm that I have read the Expert Witness Code of Conduct set out in Schedule 7 of the Uniform Civil Procedures Rules 2005 and agree to be bound by it. I acknowledge that I have made all the inquiries which I believe are desirable and appropriate and that no matters of significance which I regard as relevant have, to my knowledge, been withheld from the Court.

4. KEY DOCUMENTS REFERENCED

9. The key documents I have relied upon in understanding the contamination and waste management issues at the site are:

   a) Final Report 'Landfill Environmental Management Plan' by Dames & Moore Pty Ltd dated May 1994

   b) 'Remedial Action Plan – Moorebank Landfill, Newbridge Road, Moorebank' by Enproc Pty Ltd dated November 1998 (**the Enproc RAP**)

   c) Letter from NSW EPA (Jill Gallagher) to Enproc Pty Ltd (Arek Sinanian) 'Re Moorebank Landfill S.60 Notification' dated 16 October 2001

   d) Site Audit Statement 005/PRN and supporting Summary Site Audit Report 'Concrete Recyclers (Group) Pty Ltd, Moorebank Landfill Site, Moorebank NSW' by Egis Consulting Australia Pty Ltd (Peter Nadebaum) dated 31 December 2001 (**the SAS/SAR**)

   e) Report 'Groundwater Monitoring Report 2nd Quarter 2004' by Enproc Pty Ltd, dated 19 July 2004

   f) 'Concrete Recyclers, Environmental Management Plan, Moorebank Landfill Site Redevelopment' by Evans & Peck, dated March 2005 (**the E&P EMP**)

   g) Notice of Determination of A Development Application DA 1417/05 for Bulk Earthworks, Lot 6, DP 1065574 Newbridge Road, Moorebank dated 27 June 2006 (**the BE DA**), including conditions

   h) Director-General's Requirements, Moorebank Waste Recycling Project, Project number: 05_0157,NSW Department of Planning, dated 7 July 2008 (**the DGRs**)

   i) Report 'Environmental Site Assessment for Proposed Earthworks' by Environmental Investigation Services dated June 2009 (**the EIS ESA**)

   j) 'Conceptual Environmental Excavation Management Plan for Proposed Concrete Recycling Development' by EIS, dated June 2009 ref E22833KMP

   k) 'Draft Groundwater Assessment for Proposed Earthworks for New Concrete Recycling Plant' by EIS, dated June 2010 ref E22833K rpt3

   l) 'Report on Geotechnical Investigation for Proposed Earthworks for New Development' by Jeffrey and Katauskas Pty Ltd (**J&K**), dated 15 October 2010 ref M22833SA4rpt

   m) 'Report to Concrete Recyclers (Group) Pty Ltd on Geotechnical Issues for Part 3A Planning Application (05_157) for Material Recycling Facility at Lot 6, DP1065574 Newbridge Road, Moorebank, NSW' by J&K dated 8 November 2012

   n) 'Environmental Assessment, Materials Recycling Facility, Newbridge Road, Moorebank' by Nexus Environmental Planning Pty Ltd dated 19 February 2013 (**the EA**)

   o) 'Preferred Project Report, Materials Recycling Facility, Lots 308,309 & 310, DP 1118048, Lot 6, DP 1065574, Newbridge Road, Moorebank' by Nexus Environmental Planning Pty Ltd dated 15 August 2013 (**the PPR**), including Statement of Commitments (**SoC**) and Environmental Management Plan outline measures (**EMP outline measures**)

   p) 'Secretary's Environmental Assessment Report, Major Project Assessment, Materials Recycling Facility, Moorebank (05-0157)' by NSW Department of Planning and Environment, dated April 2015

   q) 'Additional Information, Materials Recycling Facility, Moorebank (05-0157)' by NSW Department of Planning and Environment, dated 20 July 2015

   r) Project Approval for Moorebank Materials Recycling Facility by PAC dated 11 September 2015, including Approval Conditions (**the Project Approval**)

   s) 'Determination Report, Resource Recovery Facility, Moorebank (05-0157)' by Planning Assessment Commission (**PAC**), dated 14 September 2015

   t) 'Expert Report of Sophie Wood for Moorebank Recyclers Pty Ltd' by Sophie Wood of Environmental Resources Management Australia (**ERM**), dated 6 June 2016 (**Expert Report**)

   u) 'Environmental Site Assessment, Moorebank Recyclers Pty Ltd, Moorebank NSW' by ERM, dated 6 June 2016 (**the SA**)

   v) 'Draft Operations Environmental Management Plan, Moorebank Recyclers Pty Ltd, Moorebank NSW' by ERM, dated 6 June 2016 (**the Draft Operations EMP**)

5. BACKGROUND TO CONTAMINATION AND WASTE MANAGEMENT ISSUES

10. A summary of the history of works and key findings in relation to contamination and waste management at the site is provided below based on my review of the documents listed in Section 4. Further details are provided in the following Sections 6 and 7 of this report with reference to specific Contentions and Particulars for Contamination and Waste Management issues, respectively. The background to the approval process, the environmental assessment and the planning assessments is not addressed in this report.

    a) The site is a former landfill which ceased operating in 1979. The site was operated as a landfill for a variety of non-putrescible (primarily industrial) waste. Landfill waste material observed during investigations is variously reported to include plastics, wire, cloth, soil, wool bales, medical waste (syringes), aluminium, foam, rubber and construction and demolition waste such as wood and concrete.

    b) The site is bordered to the east by the Georges River. A mangrove area is located between the landfilled area of the site and the river to the east. Residential receptors are located to the west at Georges Fair, located approximately 250m from the landfilled area at its closest point. A wooded area is currently present between the landfill and the residential area. A golf course is located to the south of the site and a former sand and gravel quarry is located to the north.

    c) The landfill appears to originally have been constructed above ground supported by perimeter earth bunds. Review of available investigation data suggests that the landfill was not constructed with a complete liner. The waste layer is generally 3m thick and silty clay capping, generally free of waste, is present between 0.6 and 2.2m depth.

    d) Environmental investigations have been undertaken at the site since at least 1989. The key document summarising the early investigation findings is the Landfill Environmental Management Plan prepared by Dames & Moore Pty Ltd (1994) which identified leachate impacts and recommended improvements to the capping. The report strongly recommended that the landfill was not opened up since "Opening up of the landfill could lead to the generation of additional quantities of leachate which could potentially have a significantly greater adverse effect on the environment".

    e) A remedial action plan (**RAP**) was prepared in 1998 by Enproc and capping improvements were made over the period 1998 to 2001. Rehabilitation works undertaken were not in strict accordance with the Enproc RAP.

    f) A SAS/SAR was prepared in 2001 to assess the condition of the site at that time. The SAS/SAR concluded that the site was suitable for commercial/ industrial use including a concrete recycling facility subject to a number of conditions, particularly in relation to the risk from leachate migration on groundwater and the Georges River, the risk to any future buildings from landfill gas and the need for ongoing management of the site.

    g) Bulk earthworks were proposed at the site by Moorebank Recyclers Pty Ltd comprising excavation of waste from the south of the site to create flood storage and placement of waste in the north of the site to raise levels and prepare the site for development as a concrete recycling facility. Construction of perimeter (above ground) noise bunds was also proposed. The development was approved by Council with conditions in 2006. The conditions required assessment of groundwater and soil contamination before works begin, and included controls for the use of fill material on the site.

    h) Additional investigations were conducted at the site by EIS in 2009/2010 in conjunction with J&K geotechnical investigations. The EIS ESA concluded that landfill leachate has had an impact on the groundwater system outside of the landfill and methane gas was

present in boreholes within the landfill. The report recommended (Section 11, page 37), "Any further works at the landfill should include a methane gas monitoring program".

i) The EA and PPR were prepared in 2013 and describe the proposed development of a materials recycling facility. Although requested in the DGRs, these documents do not include a detailed assessment of potential environmental impacts from the earthworks aspects of the proposed development since they rely on the assessment of groundwater and other contamination issues to have been dealt with in the 2006 BE DA process.

j) The EA and PPR did not include a RAP to describe the landfill rehabilitation aspects of the proposed development or environmental protection measures during development and long term operation.

k) In September 2015, the PAC approved the materials recycling facility development with conditions. The conditions require a further site audit following completion of bulk earthworks and require a landfill management plan to be developed, however, they do not address specific conditions of the 2001 SAS/SAR.

l) In my opinion, the information available at the time of approval was not sufficient to fully assess contamination and waste management impacts from the development. Potential impacts on the environment are closely related to the nature of the proposed earthworks which are not clearly described in the EA and PRR. There appear to be a number of differences in the currently proposed earthworks compared to those approved in the 2006 BE DA, including increased size of perimeter bunds and differing approaches to leachate management during excavation.

m) The SA by ERM (June 2016) has greatly improved the understanding of the current landfill gas and leachate impacts. The occurrence of asbestos in landfill capping materials or waste has not been investigated in detail in any investigations.

n) The Expert Report prepared by Sophie Wood provides a good summary of the contamination issues at the site and I generally agree with the findings presented. The report recommends a number of works that are required prior to development. In the Expert Report, Sophie Wood agreed with a number of Council's original Contentions. Conference with Sophie Wood on 1 July 2016 has confirmed she is in general agreement with Council's Amended SOFAC filed 24 June 2016.

o) None of the documents reviewed provide a comprehensive description of the currently proposed earthworks. Environmental protection measures that will be implemented during construction or for the long term stability of the redeveloped landfill (with respect to environmental impacts) are not defined in the EA or PPR. The Draft Operations EMP prepared by ERM provides a good starting point for the nature of long term environmental management requirements that are likely to be required (following completion of the redevelopment). However, details of environmental protection measures during construction are still outstanding.

6. CONTAMINATION ISSUES (CONTENTION 11A-11U)

11. Contention 11 of the Amended SOFAC states: *"There is insufficient information with respect to existing contamination at the Site and its management for a proper assessment of the risks of the Development to be undertaken. Approval of the development is not consistent with SEPP 55 Remediation of Land".* The Particulars for this Contention are reproduced below *(in italics)* along with further discussion.

    a. *The landfilling of the site occurred in the period 1972 to 1979. There is a strong possibility that the materials landfilled on the site contained asbestos.*

    b. *The Development will involve considerable earthworks and disturbance of the waste material which is present on the site.*

    c. *There are potential health and safety risks inherent in excavating into the waste including exposure to waste contaminants, asbestos and potential medical waste and leachate.*

    d. *The site is a former landfill which is identified in SEPP 55 as an activity that may cause contamination, and investigations have identified the presence of contamination at the site. Significant earthworks and reworking of landfill material are proposed as part of the development however a remedial action plan (**RAP**) has not been prepared which is a requirement of SEPP 55.*

12. The bulk earthworks which are proposed for the current development pose a number of issues including:
    a) Potential contamination of the landfilled waste with asbestos and other contaminants
    b) Potential contamination of the capping material with asbestos
    c) The management of leachate resulting from the site compaction and dewatering of the areas from which the fill material will be excavated
    d) Potential odour issues relating to dewatering of the excavated areas and exposure of wastes
    e) The change in profile of the perimeter bunds and the filling of the bunds with waste
    f) Penetration of the perimeter bunds with stormwater drainage pipework which could lead to leachate and landfill gas emissions.

13. The SEPP 55 Planning Guidelines state (Section 4.3) "Where land has been remediated in the past, contamination issues will still need to be considered when the land is proposed for redevelopment. Planning authorities will need to ensure that any residual contamination is dealt with to permit the proposed new land use, particularly if clean-up standards have changed or there is on-site encapsulation of contaminated material".

    e. *Preparation of a RAP and approval by a Site Auditor would be appropriate prior to approval for a project of this nature.*

14. A number of conditions included in the BE DA relate to the management of contamination and support the need for a RAP. These include Conditions which relate to:

a) requirements for capping of waste, both during development and the final relocated waste (19 and 20)

b) requirements of filling materials (21, 36 and 37)

c) the requirement to assess groundwater and soil contamination before works being (22 and 38, respectively).

15. A description of how the various capping and filling requirements will be addressed by the development has not been provided in the EA/ PPR. This information would be included in a RAP.

16. A RAP is Stage 3 of the site investigation process documented in the SEPP 55 Planning Guidelines. The purpose of a RAP is to set the objectives of the remediation, state the clean-up criteria and document the process to remediate the site. The NSW EPA (1997, reprinted 2000) "Guidelines for Consultants Reporting on Contaminated Sites" state "The RAP should:

a) set remediation goals that ensure the remediated site will be suitable for the proposed use and will pose no unacceptable risk to human health or to the environment

b) document in detail all procedures and plans to be implemented to reduce risks to acceptable levels for the proposed site use

c) establish the environmental safeguards required to complete the remediation in an environmentally acceptable manner

d) identify and include proof of the necessary approvals and licences required by regulatory authorities."

17. The design features and other information described in the EA and PPR do not provide details that would be considered equivalent to a RAP.

18. Under the NSW EPA (2006) "Guidelines for the NSW Site Auditor Scheme (2nd Edition)", when reviewing a RAP, a Site Auditor must be satisfied that proposed or completed remediation is technically feasible, environmentally justifiable and consistent with relevant laws, policies and guidelines. Auditor approval of a RAP prior to implementation provides confidence that the site can be made suitable for the intended use and that human health and the environment will be appropriately protected.

19. A RAP would describe the proposed earthworks, landfill capping, landfill gas protection measures and leachate management and would detail environmental management plan measures during earthworks and for long term operation. A RAP would address many of the aspects for which consideration was lacking in the application and for which consideration is required for assessment of the suitability of the development with respect to contamination and waste management issues.

f. *A Site Audit Statement (**SAS**) was prepared in 2001 and required the imposition of a number of conditions which needed to be fulfilled for the site to be considered suitable for a materials recycling facility. The application does not adequately consider the Site Audit Statement findings and the conditions. The following Site Audit Statement conditions were not adequately considered in the original application material:*

i. Landfill gas assessment was not performed.

ii. A site specific environmental management plan was not prepared.

iii. There was no detailed assessment of the groundwater impacts or ongoing monitoring of groundwater to identify impacts from landfill leachate.

20. SAS Condition 1 requires "Buildings are not erected on the site, unless an investigation of landfill gas generation has been undertaken and it is confirmed that landfill gas will not pose a risk to users of the site". A number of buildings are proposed in the development however an investigation of landfill gas generation was not undertaken until 2016 (in the SA by ERM). The Approval Conditions (11/9/15) require ongoing management documentation to "describe measures to manage the migration of landfill gas to buildings" however building designs specific to protection from landfill gas are not provided. These details would be required in a RAP.
21. SAS Condition 2 requires "The preparation and implementation of a site specific Environmental Management Plan which will ensure that the integrity of the capping system is maintained and the site is maintained in accordance with EPA requirements for closed landfills and the management of acid sulphate soils. The plan should include continued monitoring of the groundwater in select wells for a sufficient period to confirm that the discharge of leachate from the landfill has been minimised by the improved capping of the filled area and will not significantly affect the ecosystems of the Georges River. This plan should be reviewed and approved by a NSW EPA Accredited Site Auditor".
22. There is no evidence that a site specific Environmental Management Plan has been prepared and implemented. The Draft Operations EMP prepared by ERM (2016) would be an appropriate document to achieve compliance with Condition 2 if it were updated and adopted for the development. As stated by Sophie Wood in the Expert Report (Section 4.2, page 48) "Update to include actual development details, and review by a NSW Site Auditor will be necessary to provide full compliance".
23. There is no evidence that groundwater monitoring has been performed as required. In order to comply with SAS Condition 2, the groundwater assessment should address potential risk to the ecosystems of the Georges River from landfill leachate. Sophie Wood has agreed in the Expert Report and states that (Section 4.2, page 48) "It is my view that the monitoring that has been undertaken does not comply with the RAP requirements, and does not provide the information required by Condition 2 of the SAS.
24. Ongoing monitoring of groundwater is included in the Draft Operations EMP. This should be implemented for the development and approved by a Site Auditor to achieve compliance with Condition 2.
25. Some of the aspects of the SAS conditions have been considered in the various documents submitted with the development application (including potential for landfill gas in buildings, landfill cap integrity and monitoring of groundwater levels), however, consideration of the previous SAS/SAR findings was not documented explicitly in the application, and the SAS Conditions are not adequately transferred into the Approval Conditions (11/9/15). The EA and PPR do not refer to the SAS or consider the SAS Conditions in the SoC or EMP outline measures. The Approval Conditions (11/9/15) do not refer to the conditions of the SAS.

g. *Since compliance with the conditions has not been demonstrated, the SAS cannot currently be relied on for the purpose of demonstrating that the Site is suitable (from a contamination perspective) for the proposed concrete recycling facility.*

26. Sophie Wood agrees with this contention, stating in the Expert Report (Section 4.3, page 51) that "...unless the [SAS] conditions are implemented the site is unlikely to become suitable for use".
27. The SAS considered the suitability of the site (from a contamination perspective) for the proposed use based on the site condition at that time. I consider that the assessment

documented in the 2001 SAS/SAR is a valid assessment of risks of the proposal at that time (which did not include earthworks) and based on the information available at that time. However, the development currently proposed includes substantial reworking of the site including excavation of waste from the south and placement in the north of the site. Consideration of potential risks and remediation requirements for the redeveloped site is therefore required. Overall it is likely that the site can be made suitable for the intended use, however, more detailed consideration is required to confirm this compared to what was presented in the SAS/SAR.

h. *Information has since been provided to address these conditions in part, in reports by Dr Sophie Woods filed 6 June 2016, including the Environmental Site Assessment (**SA**) and Draft Operations Environmental Management Plan (**Draft Operations EMP**). Review of these documents by a Site Auditor would be required to confirm that they are adequate to address the previous SAS conditions and confirm that the Site can be made suitable for the intended use. Such a review would normally be undertaken in conjunction with review of a RAP prior to development approval (Section B Site Audit).*

i. *The Project Approval requires a Site Audit upon completion of earthworks, however, requirements for the protection of human health and the environment identified at the completion of earthworks (including in relation to the adequacy of capping, quality of material to be reused as capping and leachate management requirements) may not be able to be retrospectively incorporated into the proposed Development. The detail of these requirements should therefore be considered before approval of the Development.*

j. *A RAP would also include validation requirements to demonstrate achievement of critical elements for the protection of human health and the environment. Review of the validation requirements by a Site Auditor prior to approval of the Development would ensure that the validation information that will ultimately be required by a Site Auditor to demonstrate that the Site is suitable is collected during the development works.*

k. *Soil contamination data is inadequate and have not been properly detailed in the application material to allow for a proper assessment of the risks of the Development. The current landfill capping material is proposed to be excavated and reused to cap relocated waste in the proposed development. The current capping material has not been assessed for the presence of asbestos therefore it is not known if it will be suitable for use as capping. An assessment for the presence of asbestos is required for the current landfill capping material. Dr Sophie Wood also made this recommendation in her Expert Report on Contamination, stating in Section 4.3 that "Further assessment of the potential asbestos presence ... within current capping materials would be appropriate".*

28. Investigations undertaken prior to 2001 and reviewed in the SAS/SAR did not assess capping materials for the presence of asbestos. Subsequent investigations by EIS (2009) also did not consider asbestos. The SA by ERM (June 2016) included 14 boreholes drilled to a depth of 4m below ground level within the landfill and found that "Asbestos was not observed in the cap or in the waste at any of the locations" (Section 4.2.1). These findings are not sufficient to confirm that asbestos is not present in the capping material or waste

due to the limitations of borehole drilling for observing the presence of asbestos and the limited number of locations over the large landfill area.

29. If the current capping is not suitable for reuse, suitable material will need to be imported to the site to construct the required capping layer. Importation of material may affect the cut and fill balance of materials to be excavated and reused at the site, which may affect the ground levels in the development area or may require containment of asbestos impacted materials elsewhere on the site. These aspects may affect the viability of the project and therefore assessment of the current cap for asbestos should be undertaken prior to development consent being granted.
30. Sophie Wood, the expert acting for Moorebank Recyclers Pty Ltd, has agreed that an assessment for the presence of asbestos is required for the current landfill capping material.

l. *It is not clear what activities have taken place at the Site or what materials have been imported since the 2001 SAS that may have resulted in further contamination of the site. Further detail is required regarding the usage of the site over this period, including the source of stockpiled soils.*

m. *Dr Sophie Wood reported in her Expert Report on Contamination that she observed the presence of potential bonded ACM sheeting on the landfill surface and recommended in section 4.3 that "Further assessment of the potential asbestos presence on the surface of the site ... would be appropriate" and further that surface clearance for asbestos be undertaken prior to commencement. Council agrees with this recommendation.*

31. Documentation of activities at the site since 2001 has not been provided. Sophie Wood states in the Expert Report that (Section 4.3, page 51) "My understanding is that investigation has been the only activity that has taken place" however the basis for this understanding is not presented. The only information available is from site description information provided in relatively infrequent investigation reports (2009, 2010 and 2016). The identification of potential bonded ACM on the landfill surface suggests the potential for ongoing contamination to have occurred since 2001.
32. During my site inspection in December 2015, site surfacing materials were observed to be highly variable and a range of equipment and waste materials were stockpiled around the site. This indicates that the site has, at minimum, been used for equipment and waste storage or otherwise subject to illegal waste disposal.
33. While the specific details of the site usage are not known, I acknowledge that general equipment or waste storage is unlikely to prevent the suitability of the site for future use as a materials recycling facility. However, all stored materials should be removed and stockpiled soils would need to be characterised if they were to remain on site. Following the removal of stored materials, characterisation of the storage area footprints would be required given that surface materials are proposed to be excavated and reused as capping. These activities would be required in addition to further assessment for the potential presence of asbestos on the surface of the site and surface clearance for asbestos as recommended by Sophie Wood.

n. *The SA prepared by Sophie Wood on 6 June 2016 is stated to be a preliminary assessment and the report acknowledges that "Further phases of investigation may be needed". The SA concluded, inter alia:*

i. *the groundwater/leachate within the landfill contains elevated concentrations of ammonia, petroleum hydrocarbons and some metals;*

ii. *groundwater downgradient of the landfill is also affected by elevated ammonia and petroleum hydrocarbons;*

iii. *methane and carbon dioxide were detected in gas wells across the majority of the landfill area with high[er] concentrations and flows reported within the northern portion of the landfill;*

iv. *the calculated gas screening value of 4.33L/hr indicated that the site is classified as a moderate to high risk site requiring the implementation of appropriate mitigation measures to manage the risk of influx of ground gases into buildings;*

v. *monitoring of surface emissions has reported trace concentrations of methane across the landfill; and*

vi. *potentially complete source-pathway-receptor linkages are present in relation to impacted groundwater and ground gases which may require further assessment and management.*

o. *A number of these issues have been addressed through recommendations for ongoing monitoring (post development) and incorporated into the Draft Operations EMP. Sophie Wood also made recommendations for further works to address the SA findings in her Expert Report on Contamination. The key outstanding aspect is the design of gas protection measures for buildings.*

34. Design details for protection of buildings would be provided in a RAP. Ongoing management requirements would also be specified in a RAP.

p. *The groundwater investigation documented in the SA has indicated an increasing degree of impact to groundwater due to landfill leachate (using ammonia as an indicator) between 2001 and 2016 (including monitoring in 2004 [by Enproc Pty Ltd] and 2009 [by EIS]). This is contrary to the expectation of the previous SAS findings which required [SAS Condition 2] "continued monitoring of the groundwater in select wells for a sufficient period to confirm that the discharge of leachate from the landfill has been minimised by the improved capping of the filled area and will not significantly affect the ecosystems of the Georges River". Further information is required regarding leachate management proposed during the earthworks and contingencies for the ongoing management of leachate (post development).*

35. The monitoring results do not confirm that discharge of leachate from the landfill has been minimised and therefore further controls may be required to prevent leachate discharge from the site in its current state. The current state of knowledge regarding impacts to groundwater has not addressed the previous SAS condition with respect to leachate impacts on groundwater.
36. Leachate control is required both during the development earthworks and for the ongoing operation. Further discussion is provided under Contention 12, Particular k, below.

37. The EA and PPR do not describe in detail how leachate will be managed (including extraction and treatment) during development and do not contemplate long term leachate management.
38. Sophie Wood contends that the development will result in an overall improvement in groundwater quality due to better management of leachate and has recommended ongoing monitoring of groundwater (post development) in the Draft Operations EMP. This appears reasonable provided that appropriate leachate management is implemented during construction and for the long term operation. It is noted that this approach will have to be approved by a Site Auditor as per the Project Approval. Further comments on the proposed long term management of leachate are provided under Contention 12, Particular k, below.

q. *The groundwater monitoring undertaken since 2001, including the 2016 monitoring documented in the SA, has not been adequate to address the SAS conditions or the requirements of the NSW EPA which were documented in the Site Audit Report (letter dated 16 October 2001).*

39. As noted under Particular f, above, the monitoring that has been undertaken does not comply with the RAP requirements, and does not provide the information required by Condition 2 of the SAS.
40. The letter from NSW EPA (dated 16 October 2001) which was appended to the 2001 SAS/SAR states "...the auditor recommends the on-going monitoring of the groundwater to confirm the contaminant concentrations will remain at a low level. The EPA considers this recommendation to be appropriate and should be implemented". The lack of monitoring is therefore contrary to the NSW EPA's recommendation in addition to Condition 2 of the SAS.

r. *The Bulk Earthworks Consent, Condition 22, required "A detailed groundwater assessment report shall be submitted to Council for approval by the Department of Environment and Conservation prior to issue of a Construction Certificate for the earthworks". The groundwater investigation undertaken by EIS (2009) and submitted to Council for this purpose was not adequate to address the requirements of a "detailed groundwater assessment". In addition there is no evidence of Department of Environment and Conservation (now NSW EPA) approval of the groundwater assessment report.*

41. EIS (2009) included groundwater sampling in the south of the landfill, in the proposed excavation area. The report concludes "The data indicates that the landfill leachate has had an impact on the groundwater system outside of the landfill." The report does not conclude regarding the extent of impact. Based on the limited coverage and lack of definitive conclusions, in my opinion the EIS (2009) report is not a "detailed groundwater assessment" and does not meet the objective of Condition 22 of the BE DA Approval.

s. *The project Environmental Assessment does not adequately consider impacts to groundwater from landfill leachate since it relies on these issues having been addressed in response to the Bulk Earthworks Consent (which was not the case, as noted above).*

42. Groundwater/ leachate baseline conditions are not adequately discussed in the application (as required in the DGRs) and a detailed assessment of groundwater impacts has not been undertaken. The EA relies heavily on these issues having been addressed in the BE DA, however, the most relevant documents associated with the BE DA are the Evans & Peck EMP (2005) which does not address groundwater in detail and the EIS ESA (2009) which as discussed above is not considered to be a detailed groundwater assessment.
43. With regards to the assessment of groundwater impacts specific to the proposed development, I note that Council responded in their comments of 8/11/13 that the previous (2006 BE DA) file was lost and risk of contamination should be considered in relation to the project under assessment.
44. The EIS (2009) report was prepared in response to a condition of approval of the BE DA, however, the findings of this report were not considered in the EA. Nor were previous groundwater studies reviewed in the EIS (2009) report or the Evans & Peck EMP (2005). The assessment presented in the EA was restricted to consideration of issues following completion of the earthworks.

t. *Groundwater monitoring aspects described in the Approval Conditions are not adequate to address potential groundwater impacts. The Draft Operations EMP prepared by Sophie Wood includes additional groundwater monitoring requirements. Confirmation of proposed ongoing groundwater monitoring at the site is required.*

45. The EA proposes routine groundwater monitoring (groundwater level and composition) at eight wells during operation (J&K, 2012). These measures are not described in the SoC/ EMP. The Approval Conditions (11/9/15) require a Landfill Management Plan (Operations Manual) for the project which must "include a program of ongoing water table monitoring". This requirement is not specific to groundwater monitoring or leachate management requirements.
46. The EA notes "Some further assessment of groundwater conditions would be required to assess the potential aggressivity to buried steel and concrete" with regards to selection of foundation methods and the PPR states "Monitoring wells and surface drains would be sampled and tested routinely to identify any adverse environmental conditions which may develop". These requirements are not carried through to the SoC or Approval Conditions. Routine monitoring requirements should be included in the Operations EMP. Aggressively testing to inform foundation design appears to be outstanding.
47. The Draft Operations EMP prepared by ERM includes installation of a perimeter groundwater monitoring network and routine monitoring for groundwater/ leachate levels and contaminant concentrations. The Draft Operations EMP should be referenced in the RAP for the development and finalised based on the final development details. Any future Site Audit regarding suitability of the site for use as a materials recycling facility would need to be conditional on implementation of the (final) Operations EMP.

u. *The impact of the proposed Development on the groundwater system has not been assessed, and cannot be properly assessed without further information in relation to existing site groundwater conditions.*

48. Information recently provided including the SA by ERM (2016) and the Draft Groundwater Assessment by EIS (June 2010) has provided sufficient information to understand the existing site groundwater conditions. However, potential impacts of the proposed

development on the groundwater system are dependent on the details of the earthworks and the proposed method of leachate control during development earthworks and for the long term operation of the facility. These details have not been provided in the development documentation prepared to date (discussed further in relation to leachate under Contention 12, below). A clear description of the works and an assessment of the potential impact on the groundwater system should be provided in a RAP.

49. The Project Approval requires a Site Audit upon completion of earthworks, however, leachate management requirements identified at that stage may not be able to be incorporated into the proposed development. If the need for leachate management is identified, this is best addressed in conjunction with the proposed development design. Leachate control measures that may be required (contingency control measures) should therefore be considered before approval of the development.

50. A Site Audit should be conducted following completion of the development to confirm the suitability of the site and approve the ongoing management and monitoring measures.

7. WASTE MANAGEMENT ISSUES (CONTENTION 12A-12R)

51. Contention 12 of the Amended SOFAC states: *"The Development will change the footprint of the landfilled area with a portion of the southern part of the landfill being excavated and moved to the northern section. There is insufficient information to determine the impact of the Development on the former landfill and its management to ensure minimisation of the risk of leachate impacts on the Georges River, of tidal influences on the groundwater in the landfill, and of the potential for landfill gas to migrate to adjoining properties".* The Particulars for this Contention are reproduced below *(in italics)* along with further discussion.

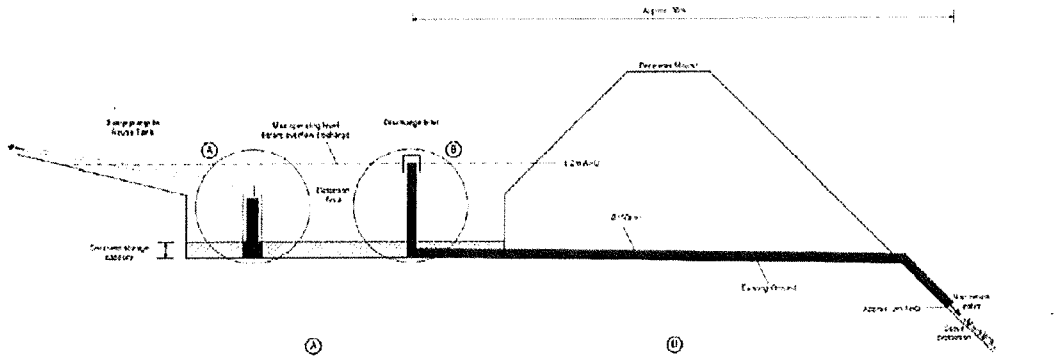
a. *There is an inconsistency between the Development and the Bulk Earthworks Consent. For example, Condition 21 of the Bulk Earthworks Consent requires the fill material used in the "Fill" area of the perimeter mound to be VENM (Virgin Excavated Natural Material). The Development proposes to utilise excavated material from the southern section.*

b. *There is insufficient information regarding construction of the perimeter mounds. The Bulk Earthworks development proposed construction of 4 metre high perimeter mounds in the north of the site with landfill material excavated from the south of the site (wet waste and fill). The modified development proposes mounds up to 8 metres high. The proposed construction materials for the extended mounds are not detailed and are required. Council notes that Dr Sophie Woods (the contamination expert for Moorebank Recyclers), in her Expert Contamination Report filed 6 June 2016, in section 4.4, agrees and states "I agree that additional detail on the proposals for the bund construction is warranted".*

c. *There is insufficient information to assess the potential environmental impact of using waste in the perimeter bunds. The potential for landfill gas generation should be considered in addition to the implication of running the stormwater sump discharge pipes through the base of the bunds. Placement of waste materials in the bunds will require future management of these areas. The Project Approval requires a Site Audit at completion of bulk earthworks. The bund construction may be found to be inappropriate*

at this stage. Details of the bund construction should therefore be considered before approval of the Development.

52. There is no process described for selection or screening of wastes excavated from the south of the site that are to be reused in the bunds. If significant quantities of organic materials are included in the waste used for construction of the bunds then ongoing degradation of these wastes could generate landfill gas within the bunds. If waste is to be used in the bunds, a screening process for the material to be used should be detailed in a management plan for the bulk earthworks.
53. The proposed development stormwater drainage system includes boundary sumps which discharge through pipes that penetrate the base of the bunds (see figure below "General Sump Arrangement, Evans & Peck 2010"). This construction would create a potential pathway for landfill gas and leachate from the waste stored within the bunds, and could result in additional leachate generation if the stormwater discharge pipe fails within the bund. Therefore it is recommended that waste is not stored in the perimeter bunds to reduce the risk of landfill gas and leachate emissions from the bunds.



Source: Expert Report of S Wood (page 33)

54. Another factor that should be considered is that if waste is stored within the bunds, then at some time in the future, if they are not managed appropriately, the bunds may be damaged or ultimately knocked down. If they contain waste, the site could be contaminated by the waste contained within the bunds. This waste could contain asbestos or other contaminants (depending on how the wastes are screened before placement).
55. Overall it is recommended that waste is not stored in the perimeter bunds, particularly if stormwater discharge pipes will penetrate the bund walls.

d. *There is insufficient detail of sampling procedures to classify the presence of asbestos or other contaminated waste within the bulk excavated material.*

e. *There is insufficient information in relation to the management of asbestos, gasses and other hazardous materials that may be encountered in the excavated waste material.*

f. *An Environmental Management Plan (EMP) must be provided for assessment by the Court. Such an EMP must deal with hazardous materials, gases and liquids that may be encountered during all works and activities to be carried on the site. The EMP should include:*

i. *an asbestos management plan*

ii. *an acid sulphate soils management plan*

iii. *details of leachate extraction, treatment and disposal during earthworks*

iv. *contingency plan for dealing with other potentially hazardous materials that could be encountered in the earthworks (for example medical wastes, concentrations of oily wastes, buried drums)*

v. *validation requirements for areas from where waste is removed*

vi. *health and safety and environmental protection should be considered*

g. *The EMP should comply with: the Site management plan (operation phase) requirements of a RAP in EPA (1997) 'Contaminated Sites – Guidelines for Consultants Reporting on Contaminated Sites'; NSW Acid Sulphate Soils Management Advisory Committee (1998) 'Acid Sulfate Soil Manual'; NSW Department of Infrastructure, Planning and Natural Resources (2004) 'Guideline for the Preparation of Environmental Management Plans'; and relevant asbestos regulations. The DGRs require such consideration of management and mitigation measures.*

h. *A site specific environmental management plan for the former landfill was not presented as part of the Development application. The [Draft Operations] EMP which was prepared by Sophie Wood on 6 June 2016 on behalf of the Respondent does not provide guidance on issues associated with earthworks construction activities as part of the Site redevelopment nor does it deal with all types of hazardous materials that may be encountered on the Site, for example asbestos. This includes whether such materials are already on the site or within the existing landfill, or whether such materials are brought to the Site during the operations of the proposed facility.*

56. The scope of the Draft Operations EMP prepared by ERM was limited to the operations phase of the development. As noted in that document the "EMP does not provide any guidance on the management of issues associated with earthworks or construction activities" (Section 1.3).
57. An environmental management plan for the bulk earthworks is required. A very simple Environmental Management Plan was prepared by Evans & Peck (2005) in support of the BE DA, however, this does not relate to the specific works currently proposed and does not provide all of the information required (listed in Particular 12g, above). A Conceptual Environmental Management Plan was prepared by EIS (June 2009) however several aspects documented have been superseded by later reports (EIS, 2010) and the document does not relate to the specific works currently proposed and also does not provide all of the information required. Some further controls are described in J&K (2010) however there is no comprehensive management document for control of the earthworks excavation, in particular in relation to reuse of waste materials and leachate management.
58. Sophie Wood is in agreement that this documentation is required, stating in her Expert Report that:
    a) "I consider that an asbestos management plan should be prepared for the proposed earthworks..." (Section 4.3, page 49)

b) "The risks from contamination exposure during the earthworks phase were to some extent considered by EIS (2009a) in their Conceptual Earthworks Environmental Management Plan. However, I have not seen reporting which provides a systematic consideration of risks to health and the environment during the earthworks" (Section 4.3, page 50)

c) "The Conceptual Earthworks Environmental Management Plan should be updated to address the current earthworks proposal, and should provide for management measures in accordance with current guidelines including leachate treatment proposals, asbestos management plan, contingency planning for hazardous materials and consideration of the need for validation of the excavated area" (Section 5).

Landfill leachate and cap

i. *Details of the proposed landfill capping are not clear in the information provided. Sophie Wood states in her Expert Contamination Report that details of the proposed new capping are provided in a report by Jeffery & Katauskas ('Report on Geotechnical Investigation for Proposed Earthworks for New Development' 15 October 2010 ref M22833SA4rpt). This report has not been provided. It is understood from Sophie Wood's Expert report that existing capping material is proposed to be excavated and reused as capping following relocation of waste material to the north of the site. It has not been demonstrated that the proposed capping is adequate to provide an appropriate barrier to hazardous materials within the landfill (including potentially asbestos), to support the increased stockpiles, to prevent infiltration of surface water and to prevent leachate breakout.*

59. The Jeffery & Katauskas 'Report on Geotechnical Investigation for Proposed Earthworks for New Development' dated 15 October 2010 has now been provided and describes the reconstructed cap in the north of the site to comprise at least 1m thickness of clay soils which is likely to be adequate to provide a barrier to hazardous materials and to prevent infiltration of surface waters.

60. Details of any improvements to capping outside the proposed works area are not clear. This includes if any modification to capping is proposed in the southern portion of the landfill known as Area 2. Landfill gas is currently able to pass through the surface of Area 2. Changes to the capping of this area may prevent landfill gas discharge of this nature and may increase the potential for offsite migration of landfill gas. It is therefore recommended that documentation of the proposed capping across the entire landfill area and an assessment of potential impacts from the proposed capping on the landfill gas regime is provided in the RAP.

j. *The Bulk Earthworks Consent (conditions 19 and 20) require covering of any uncovered waste and the capping of any waste to be left in-situ, including daily cover and final capping in accordance with Landfill Guidelines benchmark technique 28. SAS Condition 2 requires ongoing management measures to consider EPA requirements for closed landfills. The information provided is not sufficient to assess compliance with these requirements. This type of detail would normally be included in a RAP which would allow review and approval by a Site Auditor prior to development approval.*

61. NSW EPA requirements for closed landfills were not considered in the SoC/ EMP (in the EA or PPR). The EA proposes inspection of landfill capping for settlement and repair during site operation, noting that "The overall thickness of the capping layer would gradually increase with time as the landfill consolidates and design surface levels are maintained by adding to the cap. This would enhance the performance of the cap". However, these measures are not described in the SoC/ EMP. General requirements regarding maintenance of capping are included in the Approval Conditions (11/9/15) but not in reference to SAS conditions or the BE DA consent conditions.
62. In order to comply with SAS Condition 2 (with respect to landfill capping), ongoing management measures should consider NSW EPA requirements for closed landfills and the EMP should be approved by a Site Auditor.

k. *Data indicates that landfill leachate has had an impact on the groundwater system outside of the landfill site. There is no information available to enable a proper assessment of methods proposed to collect any leachate in the landfill, treat it and take it off site for disposal. These details are required for during the bulk earthworks (EMP requirements noted above) and during landfill operation (ongoing leachate management requirements).*

63. The presence of a high leachate level within the landfill has been identified during various investigations. Dewatering of leachate will be required to allow excavation in the south of the site and compaction in the north. The proposed approach to leachate management during bulk earthworks appears to have evolved over time.
64. The Evans & Peck EMP (2005) proposed pumping of water found during excavation of trenches in the landfill area and spreading this onto the existing landfill for dust suppression during excavation and filling operations.
65. J&K (2010) has proposed construction of a sheet pile wall in the south of the landfill and states that (Section 4.1.2, paragraph 10) "Dewatering of the excavation would then need to be carried out in accordance with an appropriate management plan". Dewatering via a trench drain in the north of the site is also proposed to facilitate compaction of this area and prevent leachate breakout. Treatment of groundwater is discussed in a groundwater treatment facility to be operational prior to the commencement of trench excavation. J&K (2010) states (Section 4.2.1, page 25) "Clearly a carefully formulated health and safety plan will have to be established for this work". The report is qualified by the statement "At the time of writing this report, the proposed development details had not been finalised" (Section 1).
66. EIS (2010) includes a section titled "Groundwater Treatment" (section 10.8), however, the report is in draft and the relevant section is blank ("treatment summary").
67. A management plan for dewatering has not been prepared to my knowledge and no document has considered leachate volumes and the specifics of any treatment methods. Further detail on the proposed management of leachate during the earthworks is required and should be documented in the RAP.
68. Leachate control may be required for the ongoing operation of the materials recycling facility given that leachate impacts to groundwater have not decreased as expected (as discussed under Contention 11 Particular p). In addition, the process of reforming and compacting the landfill, in addition to the ongoing operational loading from stockpiles, will vary the leachate regime and may result in increased risk of leachate discharge.

69. It is noted that earlier documentation (E&P EMP (2005)) proposed irrigation of extracted leachate for dust suppression. The leachate extracted from the site as part of the dewatering for the bulk earthworks could be quite odourous and hence may not be able to be used for dust suppression.

l. *Council notes that Dr Sophie Woods (the contamination expert for Moorebank Recyclers), in her Expert Contamination Report filed 6 June 2016, in section 4.4 in response to Council's contention 14(d), recommended that "leachate treatment and disposal is necessary during the earthworks". In addition she concludes that "Once the development is completed, leachate pumping to maintain low leachate head may or may not be necessary". The Draft Operations EMP, also filed on 6 June 2016, proposes an action level for leachate extraction if the standing level of leachate within the landfilled area is gauged to be higher than 1 metre above the base of the waste, to prevent seepage from occurring. The monitoring frequency proposed is quarterly for the first year with a reduced frequency thereafter. More frequent monitoring of the standing level of leachate would be required, including potentially in response to rainfall events, to ensure the prevention of seepage. Details of contingency leachate extraction infrastructure are required prior to approval to ensure they can be incorporated into the completed development.*

70. As noted in Contention 12 Particular l above and discussed previously, Sophie Wood agrees that an environmental management plan is required for the earthworks, including consideration of leachate management and treatment options.
71. Regarding long term leachate management, revision to the Draft Operations EMP is recommended to address more frequent monitoring of the standing level of leachate, including in response to rainfall events. More frequent monitoring in the first year is considered appropriate to assess the range of conditions likely in the reconfigured landfill, however, a quarterly frequency for leachate level monitoring is considered too low for the first year of monitoring. Given that leachate levels can respond significantly to rainfall events, non-routine monitoring after periods of high rainfall is recommended initially to determine the degree of leachate level response and if monitoring after rainfall is appropriate in the long term.
72. Revision of the Draft Operations EMP is recommended to provide details of the infrastructure to be installed during construction of the development to support "leachate pumping to maintain low leachate head" in the event that this is required. Details of the contingency management measures for long term leachate management, and what would trigger them, is required.
73. The revised Draft Operations EMP should be referenced in the RAP and be subject to review by a site auditor. Details of contingency leachate management infrastructure should also be provided in the RAP.

<u>*Landfill gas*</u>

m. *The SA by Sophie Wood filed on 6 June 2016 included a landfill gas risk assessment which classified the site as a moderate to high risk site requiring the implementation of appropriate mitigation measures to manage the risk of influx of ground gases into*

buildings. Recommendations regarding ongoing landfill gas monitoring were provided in the Draft Operations EMP also filed on 6 June 2016. Details of gas protection measures for buildings and confirmation of proposed ongoing landfill gas monitoring at the site are required.

74. The EA states "All buildings on the Site would be constructed in a manner which would prevent the build-up of landfill gas. Ongoing monitoring of landfill gas within the final building structures may also be required" however these measures are not described in the SoC/ EMP. Approval Conditions (11/9/15) require ongoing management documentation to "describe measures to manage the migration of landfill gas to buildings" however the potential need for ongoing monitoring of landfill gas is not identified.
75. The Draft Operations EMP recommends routine monitoring of ground gas from a network of monitoring wells located within and outside the landfilled area. The proposed monitoring frequency is quarterly for the first year with a reduced frequency thereafter which is considered appropriate.
76. The Draft Operations EMP recommends yearly monitoring for surface gas emissions. Non routine monitoring would also be required at any areas of cracking or damage observed during the proposed monthly inspections.
77. The Draft Operations EMP recommends quarterly monitoring in all buildings and underground utilities along with the installation of automatic methane sensors in all buildings (as required by NSW EPA (2016) 'Environmental Guidelines for Solid Waste Landfills'). This is considered appropriate.
78. The need for design of gas protection measures for buildings is supported by Sophie Wood who states in the Expert Report (Section 3.5.1) "I consider that several levels of gas protection measures will likely be needed to provide adequate protection. What these might comprise depends on the building foundation and floor slab design. ... Whatever gas protection system is adopted, maintenance and monitoring is likely to be necessary to ensure that the system continues to perform to its function throughout the life of the building".
79. It would be appropriate to include the building design details in the RAP.
80. As noted in the Draft Operations EMP (Section 3.3) revision of the document is required "Once the building design has been finalised, specific details on the selection of protection measures along with a maintenance schedule ensuring adequate performance for each of the systems selected should be added to this EMP".
81. The revised Draft Operations EMP should be referenced in the RAP and be subject to review by a site auditor.

n. *The SA also included investigation of landfill gas along the western boundary and the Draft Operations EMP recommends ongoing monitoring of perimeter gas wells and potentially further assessment of risks to off-site receptors, including due to changes that may be caused by the development earthworks. Confirmation of proposed perimeter landfill gas monitoring at the site and further details regarding contingency landfill gas management measures for the protection of offsite residents are required.*

82. Due to the sandy geology of the site and the lack of a continuous landfill liner, it is possible that landfill gas can travel along preferential pathways and create impacts at considerable distances from the landfill as was the case in the City of Casey in Victoria.

83. The dewatering of the site to allow compaction and bulk earthworks may lower the level of leachate in the landfill and hence provide new pathways for landfill gas to migrate more quickly into the surrounding strata.
84. ERM supports this, stating in the Draft Operations EMP (Section 3.5.3, page 21) "The development earthworks may result in a significant change, and further assessment of risks to off-site receptors (residential properties located 250m west) may be required. Development of site specific criteria for perimeter wells may be appropriate to provide a mechanism for triggering a need for additional management measures".
85. Sophie Wood also states in the Expert Report (Section 3.5.2, page 44) "It may be necessary to install gas wells further from the landfill on the western boundary if evidence for migration continues following completion of the proposed development".
86. Revision to the Draft Operations EMP is recommended to provide more detail on the nature of further assessment that would be undertaken for offsite migration of landfill gas and how site specific criteria for perimeter wells would be developed. Details of these contingency actions, and what would trigger them, is required.
87. The revised Draft Operations EMP should be referenced in the RAP and be subject to review by a site auditor.
88. A Site Audit should be conducted following completion of the development to confirm the suitability of the site and approve the ongoing management and monitoring measures.

Asbestos and other contaminants

o. *There is a real risk of asbestos in the existing landfill and the nature and extent of the asbestos has not been assessed. The nature and extent of the asbestos in the landfill should be assessed and an Asbestos Management Plan [for construction/ development] ought to be provided to the Court as part of the assessment process.*

The Asbestos Management Plan [for operations] must require the operator of the facility to adopt the NSW EPA 'Draft Protocol for Managing Asbestos during Resource Recovery of Construction and Demolition Materials 2014'.

89. An Asbestos Management Plan is required for the bulk earthworks as outlined under Contention 12, particulars d to h.

p. *The proposed methods to deal with the risk of asbestos arriving at the site are insufficient. Contamination is not often visible in the waste until the material is handled on site during the processing operations.*

q. *There are no measures proposed for the safe storage and appropriate disposal of contaminated materials.*

r. *Further particulars in relation to Contentions 11, 12, 13 and 14 are contained in pages 6-8 of Council's letter to Moorebank Recyclers dated 23 March 2016 in response to Moorebank Recycler's request for further and better particulars.*

ANNEXURE 1
LETTER OF INSTRUCTION

23 October 2015

SWAAB

SWAAB Attorneys

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Rowena Salmon
Environ Australia Pty Ltd
PO Box 560
North Sydney NSW 2060

Dear Ms Salmon,

Liverpool City Council v Moorebank Recyclers Pty Limited and Minister for Planning
NSWLEC 2015/10898

We act for Liverpool City Council in the above proceedings.

Instructions

We are instructed by our client to engage you as a contaminated land expert to provide advice in relation to this matter and to provide evidence in court, if required. Specifically, we would like you:

- to prepare an initial report addressed to us with respect to the contaminated land related matters which arise from:
  - any contamination present at the site and impacts on any existing contamination from the activities proposed to be undertaken at the resource recovery facility;
  - risks associated with the ongoing management of the landfill;
  - the presence of hazardous material, such as asbestos within the waste arriving on site;
  - given the land in flood prone, the impacts of flooding on the site and any possible contamination consequences on the surrounding terrestrial and/or aquatic areas;
  - the potential impacts of a pump-out septic system to contaminate surrounding terrestrial and/or aquatic areas or groundwater;
  - the adequacy of the assessment of the proposal (with respect to dust and air quality) undertaken by the Department of Planning and Environment.
- to confer with Council's other experts with respect to the matter;
- to attend a site inspection and discuss the matter with Council's legal advisors;
- to assist in the preparation of contentions for Council's statement of facts and contentions.

Partner
Chris Shaw

Contact
Ana Coculescu
Associate
+61 2 9777 8316
amc@swaab.com.au

Our ref
151403

By email
rsalmon@ramboll.com

We note that Council, who are an objector in the proceedings, do not have access to the site and therefore we are happy for a desktop assessment of these issues to be undertaken. We can provide you with access to Council's relevant records.

Expert witness obligations

As an expert witness in the Land and Environment Court, you are required to comply with Division 2 of Part 31 of the *Uniform Civil Procedure Rules 2005* and the Expert Witness Code of Conduct in Schedule 7 of the *Uniform Civil Procedure Rules 2005.* Copies of the rules are **enclosed**.

Privileged and confidential communication

All communications from you concerning this matter will be with Swaab Attorneys. These communications are privileged and confidential and are subject to legal professional privilege. All written communications should be marked "*Privileged and confidential*" except for your expert report to be filed in the proceedings.

Estimate

While you are engaged by Swaab Attorneys, the cost of your services will be covered by Liverpool City Council.

Please provide us with your fee estimate. We note the following:

1 we will be relying on your estimate to meet our disclosure obligations to the client under the Legal Profession Uniform Law (NSW). Accordingly, please provide:

   (a) an estimate of your total costs

   (b) a single figure for your estimate (not a range of costs)

   (c) an explanation of the basis on which your costs will be calculated (eg applicable hourly rates and relevant units of time, or fixed fee)

   (d) a single figure estimate of all disbursements and, where applicable, how they will be calculated; and

2 we are unable to pay any fees or expenses significantly above those stated in your estimate unless you have notified us promptly after you become aware that your estimate should be revised, giving reasons for the change.

Licence

We ask that, by accepting these instructions, you grant to Swaab Attorneys a non-exclusive, royalty free, perpetual licence to reproduce, adapt and communicate any advice you provide in connection with the instructions for the purposes of the matter and for precedent, knowledge management and training and development purposes.

We will not provide the advice to any client other than the client on whose behalf you are currently briefed without your express permission, and then only subject to any conditions you may require. If this is not acceptable, please let us know immediately.

Timing

The matter is listed for a first directions hearing in the Land and Environment Court on 5 November 2015, at which time Council must have a draft Statement of Facts and Contentions.

We would like your input with respect to contentions by **Friday, 30 October 2015**.

Yours sincerely,

Chris Shaw **Ana Coculescu**

ANNEXURE 2
R SALMON CURRICULUM VITAE

RAMBOLL ENVIRON

ENVIRONMENT & HEALTH

ROWENA SALMON

Senior Manager | NSW EPA Accredited Site Auditor

Rowena Salmon has approximately 20 years of experience in environmental consulting, predominantly in contaminated site assessment and remediation, and is a New South Wales Environment Protection Authority accredited contaminated land site auditor. Rowena has undertaken over 100 staged contamination investigation and remediation projects at sites in New South Wales, Queensland and Auckland, New Zealand, and has conducted or assisted with over 100 site audits in New South Wales and the Australian Capital Territory. These projects have been diverse in terms of size, locality, complexity, contaminant types, subsurface conditions and affected media. Rowena has also undertaken consulting projects in landfill environmental management, environmental compliance and due diligence auditing, environmental management systems and sustainability services.

CONTACT INFORMATION
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CAREER

2003-current
Senior Manager, Ramboll Environ Australia Pty Ltd, Sydney

2001-2002
Associate Environmental Engineer, URS Australia Pty Ltd, Brisbane

1994-2001
Senior Environmental Engineer, URS Australia Pty Ltd (previously Dames & Moore Pty Ltd), Sydney

June 1993
Student Environmental Engineer, HLA Envirosciences, Sydney

EDUCATION

1992-1995
BEng (1st Class Honours, Division 1) Environmental
University of New South Wales, Sydney, Australia

CERTIFICATIONS

NSW EPA-Accredited Site Auditor under Contaminated Land Management Act 1997, 2010

PROJECTS

Contaminated Site Audits

As an Auditor, Rowena has conducted the independent and technical review of the varied works associated with the assessment and remediation of potentially contaminated sites, including sampling plans, investigative works, remediation and validation plans and works. Rowena has conducted over 60 and assisted with over 70 statutory and non-statutory audit projects in NSW and ACT. Key projects have included:

- Industrial redevelopment including former gasworks at Barangaroo NSW (2010–present)
- Former gasworks at Wollongong NSW (2013–present), Site Auditor, also assistant for previous Site Audit for adjacent gasworks land (2004–2005)
- 287ha urban and educational development of rural land at Luddenham NSW (2015–present), Site Auditor
- 2ha residential development of former duck farm at Schofields NSW (2015–2016), Site Auditor
- Over 300ha urban development of rural land Box Hill North NSW (2014–present), Site Auditor
- 151ha urban development of rural land at Leppington NSW (2013–present), Site Auditor
- Hospital redevelopment at Kempsey NSW (2013–present), Site Auditor
- 675ha urban development of rural and forestry land at Molonglo ACT (2012–present), Site Auditor
- 25ha theme park development of rural residential land at Prospect NSW (2012–2013), Site Auditor
- 24ha town centre development for bushland, landfill and rural residential site at Warnervale NSW (2012–present), Site Auditor
- Service stations, fuel installations and fuel or oil depots in Bateau Bay, Concord, Eastlakes, Eden, Gilgandra, Lansvale, Lithgow, Merrylands, Merimbula, Milperra, Murwillumbah, Rozelle, Toronto, Unanderra, Windsor, Woollahra NSW and Chisholm, Curtin, Williamsdale and O'Connor ACT (2003–present), eight sites as Site Auditor since 2010
- Inner city Sydney development sites at Bondi Junction, Beaconsfield, Chippendale, Mosman, Waterloo and Woolloomooloo NSW (2010–present), Site Auditor
- Residential development of former raceway and rural land at Oran Park precinct NSW (2008–present), Site Auditor for multiple Tranches since 2011
- Quarrying complex at Penrith NSW (2008–present)
- Over 100ha reservoir facility at Potts Hill NSW (2004–2014)
- Timber products facility at Oberon NSW (2004–2012) and former timber mill at Hume ACT (2008-2010)
- Rehabilitation of landfills at Bateau Bay and Werrington NSW (2003–present)
- Defence training facility at Edmondson Park (Ingleburn) NSW (2003–present)
- Former coal loader and oil terminals, at Ballast Point (Birchgrove) and Waverton NSW (2007–2008)
- Commercial/ industrial facilities located on a landfilled brickworks, South Strathfield NSW (2003–present), as Site Auditor since 2014
- Petroleum products blending facility and plastic textiles factory at Liverpool NSW (2003)
- Portion of a former steelworks at Newcastle NSW (2003)
- A number of other sites including a foundry, mail centre, tanneries, landfills, rail yards and rural land release sites in Alexandria, Botany, Marsden Park, Mascot, Moss Vale, Narellan, Picnic Point, Seven Hills, South Creek and Waterloo NSW (2003–present).

Site Contamination Assessment and Remediation

- Project management, desktop review, SAQP design and reporting for Phase 1 and 2 assessment of a steel distribution and general warehousing facility at Auburn (2007-2008).
- Review of historical groundwater monitoring results and design of a groundwater monitoring program for a pesticides manufacturing plant in Brisbane (2002).
- Preliminary Site Contamination Assessment and project management of Stage 2 investigation works at a former Department of Defence facility in Brisbane (2002).

- Project management of a Site Contamination and Acid Sulfate Soils Assessment of a former industrial site in Brisbane (2002).
- Project management of detailed soil and groundwater investigations at a large automobile dealership in Brisbane (2001).
- Project management, field work and report preparation for the staged detailed site contamination assessment and remediation program through to Regulatory sign-off and sale of two former vehicle assembly plants in Auckland, New Zealand and Brisbane, Queensland, each with individual project values of over $400 000 (1997-1999).
- Project management and report preparation of the stage 1 contamination assessment including a preliminary field sampling program of two former Department of Defence facilities in Sydney (1998-1999).
- Project management and report preparation for the detailed stage 1 and stage 2 contamination assessment of a former rail yard located in Tumut, NSW, including the identification of strategic options for the site (1999).
- Project management, field work and report preparation for the detailed site contamination assessment of a scrap metal yard on Kooragang Island, NSW (1997).
- Project management, field work and report preparation for the staged contamination assessment and risk appraisal of a Sydney primary school located at the site of a former tannery (1996).
- Further investigation of chlorinated hydrocarbon contamination at a chemical plant at Camellia, NSW, including supervision of drilling, deep groundwater well installation, groundwater sampling, and short and long duration permeability (pumping) tests (1996).
- Project management and report preparation of preliminary environmental site assessments at three industrial facilities in Auckland, New Zealand. URS (Dames & Moore) undertook the site history reviews and directed a local contractor in undertaking preliminary field investigations (1996).
- Project management, field work, and report preparation for a combined site contamination assessment and environmental compliance audit at a lubricants production plant at Silverwater, NSW, including the assessment of contamination from plant operations and wastewater irrigation (1995).
- Project management, supervision of field work, and report preparation for an environmental investigation at a disused waterfront storage/transfer facility at Pyrmont, NSW. Investigations were carried out to assess potential offsite migration from PAH contaminated fill materials and to develop a remedial strategy (1995).
- Collation of field and analytical results, and preliminary report preparation for a first stage investigation into chlorinated hydrocarbon contamination and deep aquifer conditions at a chemical plant at Camellia, NSW (1995).
- Collation of field and analytical results, and preliminary report preparation for a ground- and surface-water chromium contamination study at a disused cement quarry in country NSW (1995).
- Investigations at a former assembly plant at Homebush, NSW, including drilling supervision and soil sampling, well installation, test pitting, soil gas survey, groundwater sampling, and permeability (slug) testing. Analysis and interpretation of field data and report preparation was conducted following completion of investigations (1994-1995).
- Project management, site history review, field work and report preparation for several staged contamination investigations, involving an initial historical review followed by field assessment, at a range of sites in NSW and Brisbane for Clients including the CSIRO, NSW Public Works, State Property NSW and developers/architects. Tasks include review of: topographic, geologic and hydrogeologic maps; historical air photographs; groundwater data; site histories; historical title; EPA notices; development histories; employee interviews; field data; and laboratory results (1995-2002).

Solid Waste Landfill Investigations and Environmental Management

- Project management of the ongoing Environmental Management of a rehabilitated former landfill site in Homebush, NSW on behalf of the Ford Motor Company. This role included development and implementation of environmental monitoring programs, operation and maintenance of landfill leachate and gas collection and treatment systems, general site maintenance and regular reporting to the Client and regulatory authorities (EPA, Council and Sydney Water) (1998-2002).

- Project management of soil sampling and health risk assessment for a former municipal landfill in Queensland which had been redeveloped as a residential area in the 1970's (2001).
- Preparation of Landfill Environmental Management Plans (LEMPs) for two solid waste landfills each receiving 100 000 tonnes of waste per annum in the Gosford City Council area (2000).
- Review of Landfill Licence conditions and design of Environmental Improvement Programs including for landfill gas monitoring and leachate management at a landfill at Wisemans Ferry on behalf of Hornsby Shire Council (2000).
- Detailed monitoring of the production and composition of landfill gas produced by a rehabilitated former landfill site at Homebush, NSW, for assessment of feasibility for the development of a cogeneration facility to convert landfill gas to energy (1999).
- Project management for the environmental investigations and rehabilitation design for recreational use at a former landfill and nightsoil depot in Camden, NSW. Investigations included drilling and groundwater monitoring well installation, surface and groundwater sampling, test pit excavation for cover assessment and monitoring for landfill gas (1999).
- Design of monitoring programs for the protection of human health and the environment during the three month construction period of a capping system at a former landfill site at Homebush, NSW, and reporting on monitoring results at completion of the site rehabilitation for Regulatory sign-off (1997).
- Detailed investigations and environmental monitoring at a former landfill site at Homebush, NSW, including groundwater sampling, permeability (slug) testing, landfill gas sampling, boundary gas probe monitoring, infiltrometer testing, infiltration gallery testing, ambient air sampling, fluxhood sampling, odour monitoring and landfill settlement monitoring (1994-1998).

Environmental Auditing and Risk Assessment

- Project management of a program of vendor due diligence audits (environmental compliance and preliminary site contamination assessments) at 13 Ford Dealerships in Auckland, 7 in Perth, 28 in Sydney and 4 in Brisbane, including development of a standard audit protocol for application across the remainder of Australia. Two reports were prepared per site (1999-2001).
- Post-closure financial risk assessment using the RISQUE method for a former Gold Mine in North Queensland (2001).
- Hazard and risk assessment component of an Environmental Impact Statement for the construction and operation of a tourist rainforest cableway in Queensland (2000).
- Project Management of a comprehensive annual audit program for Stanwell Corporation Limited, covering environmental compliance, ESAA Code of Practice, health and safety, Wet Tropics Agreement, Environmental Management Systems, Key Performance Indicators and Corporate Environmental Report Verification (2000).
- Auditing of compliance with environmental management plans for two temporary vehicle depots in Sydney during the Olympics (2000).
- Numerous combined environmental compliance and preliminary site contamination assessment audits at facilities in Brisbane and NSW, including:
- Purchaser due diligence for two foundries in Brisbane (2001)
- Purchaser due diligence for a drum reconditioners and a container manufacturing facility in Brisbane (2001)
- Purchaser due diligence for a petroleum systems manufacture and service facility in Brisbane (2001).

Environmental Management Systems

- Auditing of environmental management systems against ISO14001 for industrial facilities in Brisbane including a shower screen manufacturer (2001).
- Auditing of health, safety and environmental management systems against internal international corporate guidelines at a transformer manufacturer in Brisbane (2001).
- Development of a simplified system of environmental management for application to Ford Dealerships in Australia. The system was based on the critical elements of ISO14001, and was developed with the knowledge gained from conducting environmental audits at several such Dealerships (1999).

- Preparation of environmental management system documentation for implementation of an ISO14001 certifiable EMS at a rehabilitated former landfill at Homebush, NSW (1998).

Corporate Sustainability Services

- Review of environmental management structure for Ergon Energy (2001).
- Strategic Environmental Review for Stanwell Corporation Ltd (2001).
- Conduct of sustainability audits against the Electricity Supply Association of Australia's (ESAA) Code of Environmental Practice as Lead Auditor for Ergon Energy (2001),Transgrid (2002) and Integral Energy (2004), and as Assistant Auditor for NorthPower, Power and Water Authority NT, Integral Energy and Advance Energy (all 2000).
- Project management of the verification of Stanwell Corporation's 1999/2000 Corporate Environmental Report and 2000/2001 Community Report including review of internal environmental, health and safety reporting systems (2000, 2001).
- Project management of the verification of Thiess Pty Ltd's 1999/2000 and 2000/2001 Health, Safety, Environment and Community Relations Reports. The projects involved a detailed review of internal reporting processes, covering head office and a selection of business units and representative project sites, culminating in a verification statement for inclusion in the Report and detailed recommendations relating to improvement of internal reporting systems (2000, 2001).
- Review of environmental objectives, targets and KPIs for NorthPower (2000).
- Presentation to the Ford Asia Pacific Environmental Conference in Shanghai, comprising environmental representatives from Ford manufacturing plants throughout the Asia Pacific region, on the Management of Underground Storage Tanks (2000).
- Presentation to property managers within CSIRO Corporate Property Unit on environmental aspects of property management and environmental regulatory requirements associated with property transfer in NSW (1996).

PUBLICATIONS

2002

Corporate Environmental Reporting.

Presented at Enviro2002, Melbourne and Green Processing 2002, Cairns.

Authors: Byrne, G., Salmon, R. and Jones, C.

TEACHING EXPERIENCE

2014-present

Contaminated Site Assessment, Remediation and Management Short Course, UTS Science School of the Environment

2003

Guest Lecturer, UTS Faculty of Design, Architecture and Building

MEMBERSHIPS

Australian Contaminated Land Consultants Association (ACLCA)
Environment Institute of Australia and New Zealand
Institution of Engineers - Australia