Form A (version 2)

INDIVIDUAL EXPERT REPORT OF ANDREW JACKAMAN

19 AUGUST 2016

COURT DETAILS	
Court	Land and Environment Court of New South Wales
Class	1
Case number	2016/159652 (formerly 2015/10898) & 2016/157848 (formerly 2015/10951)

TITLE OF PROCEEDINGS PROCEEDINGS 2016/159652	
Applicant	**Liverpool City Council**
First respondent	**Moorebank Recyclers Pty Ltd**
Second respondent	**Minister for Planning**

PROCEEDINGS 2016/157848	
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	**Moorebank Recyclers Pty Ltd,** First respondent in proceedings 2016/159652 and Second respondent in proceedings 2016/157848
Legal representative	Mark Gerard McDonald, Mark McDonald & Associates Lawyers Pty Ltd
Legal representative reference	MGM 01/246
Contact name and telephone	Mark Gerard McDonald, (02) 9293 2519
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Report

to

Mark McDonald & Associates Lawyers Pty Ltd

on

Geotechnical Expert Opinion

into the matter of

Land and Environment Court of New South Wales
Proceedings No. 2016/159652 (formerly 2015/10898)
Liverpool City Council v Moorebank Recyclers Pty Ltd
and Minister for Planning

for

Proposed Materials Recycling Facility

at

Lot 6, DP 1065574 Newbridge Road, Moorebank, NSW

19 August 2016
Ref: M22833A10rpt

JK Geotechnics
GEOTECHNICAL & ENVIRONMENTAL ENGINEERS

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Date: 19 August 2016
Report No: M22833A10rpt

Report prepared by:

Andrew Jackaman
Senior Associate | Geotechnical Engineer

For and on behalf of
JK GEOTECHNICS
PO Box 976
NORTH RYDE BC NSW 1670

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1 EXECUTIVE SUMMARY

1.1 On behalf of Moorebank Recyclers Pty Ltd, I have responded to the geotechnical issues raised in the Amended Statement of Facts and Contentions (filed 24 June 2016) and in the expert report of Dr Peter Redman (filed 20 July 2016).

1.2 In the preparation of this report I have relied upon the current design drawings prepared by Lyle Marshall & Associates Pty Ltd (dated 25 July 2013), three relevant previous reports prepared by Jeffery and Katauskas Pty Ltd (now trading as JK Geotechnics), and expert contamination report prepared by Dr Sophie Wood (dated 6 June 2016).

1.3 I have also relied upon information provided by Moorebank Recyclers Pty Ltd that the originally proposed acoustic earth mounds which were located on the eastern, western and northern sides of the proposed demolition and construction waste recycling facility, as shown on Lyle Marshall & Associates Pty Ltd drawings, will be replaced with engineered concrete panel walls.

1.4 Based on the documents I have relied upon and the information provided by Moorebank Recyclers Pty Ltd, I have addressed each of geotechnical issues raised in the Amended Statement of Facts and Contentions and the Dr Redman report. Some of these issues had already been addressed in previous Jeffery and Katauskas Pty Ltd reports. Others will be addressed in the Remedial Action Plan, which is currently being prepared by ERM with the assistance of the other experts engaged by Moorebank Recyclers Pty Ltd, including myself. Some issues relate to detailed design matters for which I have provided my advice.

1.5 All issues relating to the originally proposed perimeter acoustic earth mounds are no longer relevant.

2 INTRODUCTION

2.1 This expert report is in response to a brief provided by Mark McDonald & Associates Lawyers Pty Ltd, representing Moorebank Recyclers Pty Ltd, in their letter of instruction dated 17 August 2016 (refer to Annexure A). The first part of my brief was to respond to the geotechnical issues raised in the Amended Statement of Facts and Contentions (filed 24 June 2016), which were provided to me by Mr Mark McDonald of Mark McDonald & Associates Lawyers Pty Ltd.

2.2 The matter relates to the Moorebank Recyclers Pty Ltd development application (05_0157 dated 12 October 2005) to the NSW Department of Planning for the construction and operation of a demolition and construction waste recycling facility (**the Development**) at Lot 6, DP 1065574 Newbridge Road, Moorebank, NSW (**the Site**). The Planning Assessment Commission (PAC) approved the development on 11 September 2015. Liverpool City Council, Benedict Industries Pty Ltd and Tanlane Pty Ltd have since lodged appeals against the PAC decision.

2.3 I am a practicing geotechnical engineer with a Masters degree in Engineering Science (Geotechnical Engineering). I have over 20 years experience, predominantly in Sydney, and my interest areas include the rehabilitation of former landfills and earthworks projects. My Curriculum Vitae is attached in Annexure B.

2.4 I have been instructed by Mr McDonald to review and respond to the geotechnical issues raised in the Amended Statement of Facts and Contentions, including:

2.4.1 Contention 10 Geotechnical Issues

"There is insufficient information with respect to geotechnical issues for a proper assessment of the impacts of the Development.

Particulars

a. *There has been insufficient investigation into the impact the proposed piles through the former landfill and landfill liner system will have on groundwater conditions and the preferred movement of any landfill gas existing the waste mass or stormwater infiltration leachate from the site towards the Georges River.*

b. *The geotechnical risk of differential settlement caused by placement of the proposed bunds, various site working stockpiles and structures, as well as traffic*

generated by the development, has not been adequately addressed for a proper assessment of the risks to be undertaken."

2.4.2. Contention 12 Waste Management

"*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 adjoin properties.*

Particulars

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.*

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 and 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."

2.5 I had preliminary conferral with Liverpool City Council's geotechnical expert, Dr Peter Redman, on 4 July 2016 to discuss the geotechnical issues relevant to the proposed development.

2.6 The second part of my brief was to review the supplied expert report of Dr Redman (Report PR214/1-AB, dated 19 July 2016, and filed on 20 July 2016) and to reply to any issues raised.

3 CODE OF CONDUCT

3.1 I acknowledge that I have read Schedule 7 'Expert Witness Code of Conduct' to the New South Wales Uniform Civil Procedures Rules 2005, confirm that this report has been prepared in accordance with the instructions included in Schedule 7, and that I agree to be bound by this Code.

4 DOCUMENTS RELIED UPON

4.1 In the preparation of this report, I have relied upon the following documentation:

4.1.1 Design drawings prepared by Lyle Marshall & Associates Pty Ltd (Job No. 5018-13, Sheet Nos. 00 to 21, Issue A, dated 25 July 2013).

4.1.2 'Report to Concrete Recyclers (Group) Pty Ltd on Geotechnical Investigation for Proposed Earthworks for New Development at Lot 6, DP 1065574 Newbridge Road, Moorebank, NSW' prepared by Jeffery and Katauskas Pty Ltd (now trading as JK Geotechnics); report Ref. 'M22833SA4rpt' dated 15 October 2010 (**J&K 2010 report**). I was the primary author of the J&K 2010 report.

4.1.3 'Report to Concrete Recyclers (Group) Pty Ltd on Geotechnical Issues for Proposed Earthworks for Part 3A Planning Application (05_157) for Material Recycling Facility at Lot 6, DP 1065574 Newbridge Road, Moorebank, NSW' prepared by Jeffery and Katauskas Pty Ltd; report Ref. 'M22833SA6.2rpt' dated 8 November 2012 (**J&K 2012 report**).

4.1.4 'Report to Concrete Recyclers (Group) Pty Ltd on Supplementary Geotechnical Investigation for Design of Key Structures at Lot 6, DP 1065574 Newbridge Road, Moorebank, NSW' prepared by JK Geotechnics; report Ref. 'M22833SA9rpt' dated 8 October 2015 (**J&K 2015 report**). I was the primary author of the J&K 2015 report.

4.1.5 Expert Contamination Report prepared by Dr Sophie Wood of ERM, report Ref. '0337609 R02 F01' dated 6 June 2016.

4.1.6 Individual Expert Report of Dr Peter Redman, report Ref. 'PR214/1-AB' dated 19 July 2016.

4.1.7 Expert Acoustics Report prepared by Dr Renzo Tonin, report Ref. 'TH925-01F03' dated 17 August 2016.

4.2 Since the commencement of my involvement at the Site in March 2009, I have sighted many reports prepared by the Jeffery and Katauskas Pty Ltd/JK Geotechnics, Environmental Investigation Services (EIS) who are the environmental consulting division of JK Geotechnics, and others. I have not relied upon these reports in the formulation of my opinion of the current geotechnical issues raised.

5 UPDATED FACTS ON WHICH THE OPINION IS PARTLY BASED

5.1 On 5 August 2016, I was advised by Mr Brent Lawson, the Managing Director of Moorebank Recyclers Pty Ltd, that the 4m, 6m and 8m high acoustic earth mounds which are located on the eastern, western and northern sides of the Development, respectively, as shown on Lyle Marshall & Associates Pty Ltd Drawing Nos. 01 to 06, are to be replaced with concrete panel walls. The option to replace the acoustic earth mounds with walls is discussed in paragraph 149 (Section 8.1) of the expert report prepared by Dr Tonin.

5.2 On 18 August 2016, I was advised by Mr Lawson that the perimeter bund walls will be raised to reduced level (RL) 6.0m in order to provide flood protection to the Development.

5.3 I further understand from Mr Lawson that the proposed concrete panel walls will be appropriately designed and supported on piles which will penetrate the existing and proposed perimeter bund walls (that contain the landfill materials) and will be embedded into the underlying fluvial soils.

6 GEOTECHNICAL OPINION

6.1 Amended Statement of Facts and Contentions

In the section below I have replied to geotechnical issues raised in the Amended Statement of Facts and Contentions, as discussed in paragraphs 2.4.1 & 2.4.2.

Contention 10(a)

6.1.1 Based on the ten total boreholes which were drilled through the landfill profile (ie. nine boreholes from the J&K 2010 report and the one borehole from the J&K 2015 report), no continuous clay base liner was encountered. In my opinion, there is no effective lining system along the base of the landfill.

6.1.2 The proposed plant and structures will be supported on driven piles founded in the fluvial sand profile below the landfill. Based on the limited plan area of driven piles, the expected highly permeable nature of the landfill material and underlying fluvial sand, and the fact that there is no effective lining system, it is my opinion that the proposed piles will have negligible effect on the groundwater conditions at the Site.

6.1.3 The proposed piles will permit escape of landfill gases at the surface due to movement of piles under lateral loads and/or shrinkage of the clay capping soils away from the piles

and/or due to landfill settlement. This issue can be dealt with in the detailed design stage. For detailed design, I will be recommending that all pile heads must be covered with concrete slabs, which must include embedded perimeter edge beams and a gas drainage sub-base layer to capture gas emissions so that they can be appropriately vented. Covering the pile heads with concrete slabs will also prevent stormwater runoff from infiltrating into the landfill.

Contention 10(b)

6.1.4 As detailed in paragraph 5.1, the proposed bunds (referred to in this report as 'acoustic earth mounds') have been deleted. All proposed plant and structures will be supported on piles.

6.1.5 Contention 10(b) now relates to differential settlements caused by working stockpiles and traffic. Differential settlements were discussed in Section 4.2.3 of the J&K 2010 report and in Section 2.1 of the J&K 2012 report. In the J&K 2010 report there was a recommendation that survey monuments be installed, measured and monitored following construction of the capping layer to confirm the settlement rate across the Site.

6.1.6 Based on my current knowledge of working demolition and construction waste recycling facilities, such that the surface is periodically regraded, it is my revised opinion that fixed survey monuments would likely be damaged or buried by the surface re-profiling works. My preference would be to carry out periodic detailed level ground surveys of the Site so that surface levels and grades can be monitored, and compared back to previous surveys.

6.1.7 Differential settlements/surface movements arising from stockpile and traffic loads are expected to be identifiable by visual inspection (eg. rutting, surface heave, subsidence, etc.) and survey monitoring, and must be rectified as soon as they are identified; for example, by top dressing. The monitoring program and rectification works will be detailed in the Remedial Action Plan (RAP). The RAP is currently being prepared by ERM with the assistance of the other experts engaged by Moorebank Recyclers Pty Ltd, including myself.

6.1.8 Differential settlements due to traffic loads are expected to be minor due to the transient nature of the applied loads. If differential settlements/movement of the capping layer occurs under stockpile loads such that the integrity of the capping layer is compromised (eg. by tension cracks), then the stockpile must be immediately removed and the capping

layer rectified/reconstructed. This will be detailed in the RAP. If the differential settlement/movement is significant such that rectification/reconstruction of the capping layer may only be a short-term measure, then it may be appropriate to design and install a piled footing system to support the stockpile loads.

Contentions 12(b) & 12(c)

6.1.9 As detailed in paragraphs 5.1 & 5.3, the proposed bunds (referred to in this report as 'acoustic earth mounds') have been deleted and will be replaced with engineered concrete panel walls.

Contention 12(i)

6.1.10 In Section 4.2.3 of the J&K 2010 report, the pertinent details of the recommended new capping layer from bottom to top included:

- Placement of a dense grade geotextile filter fabric above the compacted landfill materials to provide a separation and tensile layer below the capping materials.
- Construction of a new capping layer of at least 1m thickness and predominantly comprising clay soils. The maximum particle size of the material was limited to 75mm. A strict and appropriate compaction specification was provided for the clay soils.
- Provision of a 300mm thick surface layer (within the minimum 1m thick capping layer profile) of well graded granular material to provide a working platform. A strict and appropriate compaction specification was provided for the granular material.

6.1.11 The J&K 2010 report also recommended Level 1 inspecting and testing of the earthworks, in accordance with Section 8.2 of AS3798-2007 'Guidelines on Earthworks for Commercial and Residential Developments. The testing frequency was in accordance with the guidelines for 'Type 1 Large Scale Operations' in Table 8.1 of AS3798-2007.

6.1.12 The new capping layer detail recommended in the J&K 2010 report generally complies with the final capping requirements detailed in the current 'Environmental Guidelines, Solid Waste Landfills' publication prepared by the NSW Environmental Protection Authority (EPA) [Second Edition, 2016]. In order to align the J&K design closer to the NSW EPA final capping requirements, it is my opinion that the following minor adjustments be adopted:

6.1.12.1 The maximum particle size of the capping material should be reduced to 50mm in any dimension. This will be specified in the RAP.

6.1.12.2 A geotechnical engineer must carry out insitu or laboratory hydraulic conductivity testing to confirm that the capping materials have a saturated hydraulic conductivity of less than 1×10^{-9} metres/second. The geotechnical engineer must complete a sufficient number of tests to provide confidence that all excavated clay soils from the Site and any imported clay virgin excavated natural material (VENM) have a hydraulic conductivity of less than 1×10^{-9} metres/second. If required, the geotechnical engineer must provide guidance on the blending of materials in order to meet the hydraulic conductivity requirement. If in areas the hydraulic conductivity requirement cannot be met, then alternative appropriate design advice [eg. incorporation of a geosynthetic clay liner (GCL) within the capping layer profile] must be provided by the geotechnical engineer. This testing and advice will be specified in the RAP.

6.1.13 In relation to the new capping layer design detailed in paragraph 6.1.10, I note that the preparatory earthworks involves stripping the existing cap to a maximum depth of 0.5m, then undertaking heavy compaction. Where the existing cap is still intact following heavy compaction (ie. where landfill materials are not exposed), particularly in those areas where a thick cap already exists (ie. well in excess of 0.5m), it is my current opinion that a dense grade geotextile filter fabric may not be required. The deletion of the dense grade geotextile filter fabric in these areas will be at the discretion of the inspecting geotechnical engineer, and will be specified in the RAP.

6.2 Individual Expert Report of Dr Peter Redman

In the section below I have replied to geotechnical issues raised in the expert report prepared by Dr Redman.

6.2.1 *1.4.3 The Geotechnical Aspects*

14(d) The Construction of 8m high bunds as noise walls.

As detailed in paragraphs 5.1 & 5.3, the proposed bunds (referred to in this report as 'acoustic earth mounds') have been deleted and will be replaced with engineered concrete panel walls. I note that Dr Redman refers to the originally proposed 4-8m high acoustic mounds as 'bund walls'.

6.2.2 *2.1 The Range of Issues*

15(d) Bund walls;

(i) Use of landfill materials and the extent to which strength and stiffness parameters can be assessed for design.

(ii) Batter slopes for bund walls;

(iii) Extent to which landfill would need to be removed from under bund walls.

This is no longer an issue as the proposed bunds (referred to in this report as 'acoustic earth mounds') have been deleted and will be replaced with engineered concrete panel walls.

6.2.3 *2.1 The Range of Issues*

15(e) Other Aspects;

(i) Overall sequencing of the various steps in the work;

(ii) Acid Sulphate soils – their occurrence and control;

(iii) Structures for containment of pumped groundwater during the earthworks;

(iv) OH&S issues with use of landfill materials (contaminated) in earthworks.

These issues will be addressed in the RAP.

6.2.4 *2.2.1.2 The sheet pile wall*

20 The proposed sheet pile wall will need to act as a cut off if it is to control inflows into the excavation. An issue will be how effective a limited length run sheet pile wall, with partial penetration into the fluvial soils will be.

The assertion by Dr Redman that the sheet pile wall would be of limited length is unfounded. In Section 4.1.1 of the J&K 2010 report, I discussed that the sheet pile wall would need to be installed across the southern end of the landfill. The sheet pile wall would need to be installed to a sufficient depth to ensure adequate embedment into the fluvial soils not only for lateral stability but also to 'cut-off' into the fluvial silty clays to control seepage through flow.

6.2.5 *21 Whilst clay soils have been identified in the J&K investigations, questions could arise about the continuity of such layers over the proposed extent of the sheet pile wall. A further issue would be the effectiveness of the existing bund walls in containing groundwater/leachate.*

The continuity of the clay soil layers must be confirmed by additional geotechnical investigations during the detailed design phase recommended in Section 4.1.1(5) of the J&K 2010 report. If in some areas clay soils are not encountered, then I will be recommending that the sheet piles be embedded at sufficient depths so that groundwater inflows can be controlled.

To my knowledge there has been no reported leachate breakout through the existing bund walls at the southern end of the Site. The earthworks also includes the lowering of the groundwater/leachate level within the landfill by drainage. Notwithstanding, the RAP will include inspection of the bund walls during the excavation works by a geotechnical engineer, and if seepage is observed emanating from the bund walls, then they must be appropriately rectified.

6.2.6 *2.2.1.3 Temporary batter slopes*

24 Clearly the temporary batter slopes need to be designed …

25 A standard geotechnical approach to characterising the strength parameters …

Based on my experience with similar landfill materials, I recommended in Section 4.1.2(9) of the J&K 2010 report that "*excavation along the southern end of the former landfill should be tentatively cut to a temporary batter slope of no steeper than 1 Vertical (V) on 2 Horizontal (H) subject to geotechnical inspection.*" In Paragraph 24, Dr Redman appears to be confirming this advice. If during excavation, the temporary batters are assessed by the geotechnical engineer to be potentially unstable at 1V on 2H, then they will need to be flattened as appropriate. This issue will be addressed in the RAP.

I concur with Dr Redman that it is difficult to rationalise shear strength parameters for the landfill materials, particularly due to their variability. From a constructability point of view, the assessment of temporary batter stability will need to be assessed by a geotechnical engineer during each stage of excavation. This issue will be addressed in the RAP.

6.2.7 *2.2.1.4 Permanent southern batter slope*

28 Issues arise about the long-term functioning of the GCL if there is any continuing settlement of the underlying materials (landfill or fluvial clays). Also an issue would be whether the presence of landfill materials would impact on the ability to adequately compact any overlying engineered fill.

The GCL has been nominated as they are often used in landfill applications and can tolerate some differential movements arising from long-term settlement of the landfill materials. If future surface subsidence indicates that there may be loss of integrity of the GCL, then the affected section would need to be excavated to expose the GCL for inspection. The GCL can then be repaired as appropriate, and the bank reinstated. This issue will be addressed in the RAP.

If adequate engineered fill compaction cannot be achieved up against the landfill materials exposed in the temporary batter slope, then bridging layer support (eg. a zone of coarse recycled concrete) and/or high tensile geotextiles must be provided as per standard earthworks practice. In Section 4.1.3(12) of the J&K 2010 report, I recommended that "*prior to the placement of the GCL, the temporary cut batter surface should be inspected by an experienced geotechnical engineer to assess whether geogrid support is required to support*

the proposed filling in front of the face." This inspection will be detailed in the RAP. If coarse recycled concrete is provided, then the GCL will need to be protected from puncturing by provision of a dense grade non-woven geotextile filter fabric.

6.2.8 *2.2.2.2 Western bund wall*

30 Comment in Section 2.2.1 above on the design and construction of temporary batters in landfill materials are also applicable to the works proposed for the western bund reconstruction.

My comments provided in paragraph 6.2.6 are valid here.

6.2.9 *2.2.2.3 Heavy compaction*

32 However, in my experience, the effectiveness of impact rolling as a ground improvement measure …

Noted. I concur with Dr Redman.

6.2.10 *33 In such circumstances the issue arises as to the capacity of the existing landfill materials to adequately support developments in the northern part of the Site. The developments would include bunds and stockpiles.*

Section 2.1 of the J&K 2012 report addressed this issue. If the densified landfill materials and new capping layer are inadequate to support the proposed stockpiles as assessed by inspection and survey monitoring (as discussed in paragraphs 6.1.5, 6.1.6 & 6.1.7) due to bearing capacity failure and/or unacceptable differential settlements, such that the integrity of the capping layer is compromised, then it will be necessary to either rectify/reconstruct the capping layer or support the stockpiles on a piled footing system, as discussed in paragraph 6.1.8.

6.2.11 *2.2.3 Buildings and Stockpiles*

39 Stockpiles are understood to be up to about 10m high. Issues will exist about the bearing capacity of the ground …

Lyle Marshall & Associates Pty Ltd Drawing Nos. 03 to 06 show 4m and 7m high stockpiles. My comments provided in paragraph 6.2.10 are valid here.

6.2.12 *2.2.4 Bund Walls (40, 41 & 42)*

This is no longer an issue as the proposed bunds (referred to in this report as 'acoustic earth mounds') have been deleted and will be replaced with engineered concrete panel walls.

ANNEXURE A

Mark McDonald & Associates Lawyers Pty Ltd Brief

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17 August 2016

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Mr Andrew Jackaman
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By Email

Dear Sir

MOOREBANK RECYCLERS PTY LTD ATS LIVERPOOL CITY COUNCIL & ORS; LAND AND ENVIRONMENT COURT PROCEEDINGS 2016/159652 & 2016/157848

I refer to the above proceedings.

I am instructed by Moorebank Recyclers Pty Ltd (**Moorebank**) in respect of the above proceedings.

I confirm that I am instructed to retain you to prepare an expert report in the above proceedings.

I note that my firm has previously provided you with a copy of documents, including:

1. Division 2 of Part 31 of the Uniform Civil Procedure Rules 2005 (**UCPR**);
2. The Expert Witness Code of Conduct at Schedule 7 of the UCPR;

3. The amended Statement of Facts and Contentions filed on behalf of Liverpool City Council (**Council**) in the above proceedings (**Council SOFAC**);

4. The amended Statement of Facts and Contentions filed on behalf of Benedict Industries Pty Ltd and Tanlane Pty Ltd (**Benedict**) in the above proceedings (**Benedict SOFAC**); and

5. The expert report of Peter Redman dated 19 July 2016 (**Redman Report**) which has been filed on behalf of the Council in the above proceedings.

You report should:

(a) respond to the contentions in respect of geotechnical issues at paragraphs 10 and 12 of Part B of the Council SOFAC; and

(b) respond to the matters identified in the Redman Report.

Yours faithfully

Mark McDonald
Townplanning & Environment Lawyer
Acc. Spec. (Loc. Govt. & Plan. Law)

ANNEXURE B

Curriculum Vitae for Andrew Jackaman

JK Geotechnics
GEOTECHNICAL & ENVIRONMENTAL ENGINEERS

ANDREW JACKAMAN

EDUCATIONAL QUALIFICATIONS	Bachelor of Engineering (Civil), UNSW, 1995. Master of Engineering Science (Geotechnical Engineering), UNSW, 1999.
MEMBERSHIPS	Member, Institution of Engineers, Australia. Australian Geomechanics Society. Associate Member, Australian National Committee on Large Dams Inc.

PROFESSIONAL HISTORY

1995 – Present

Senior Associate (2008 – Present).
JK Geotechnics, Sydney.

Responsibilities:

- Costing, planning, coordinating, carrying out and reporting on geotechnical investigations mostly in NSW.
- Projects include:
  - building structures,
  - pavements,
  - earthworks,
  - dams and levees,
  - hillside and riverbank instability, and stabilisation works,
  - rehabilitation of former landfills,
  - forensic investigations of damaged structures,
  - dilapidation surveys,
  - remote area investigations,
  - over-water investigations,
  - geotechnical instrumentation and monitoring.
- Inclinometer equipment and software.
- Senior member of JK Geotechnics training committee.
- Inspections during construction, including proof rolling, shallow footings and piles.
- Provision of Expert Witness services for CTTT matters, Land and Environment Court, District Court and Supreme Court.
- Company management.

Major Projects

RECENT MAJOR PROJECTS INCLUDE:

- **North Turramurra Recreation Area (North Turramurra Former Landfill), NSW**: Geotechnical engineer responsible for \investigations during design and for the provision of geotechnical advice during construction for the redevelopment of the former landfill to accommodate the extension of North Turramurra Golf Course and for new playing fields, car parks and buildings. The former landfill contained three fill slopes up to 50m high. Instability had occurred on these slopes. Andrew has monitored these slopes since 1999. Recent investigations were for drainage and slope stabilisation works, including Gabion walls, a 60m long contiguous pile wall, and a stabilising berm. Investigations have included deep boreholes, test pits, hazardous ground gas monitoring, installation of numerous vibrating wire piezometers at various levels in the landfill, rainfall analyses, seepage analyses using SEEP/W and stability analyses using SLOPE/W. Two large scale impact rolling trials were undertaken. Advice was provided on long-term settlements, earthworks, impact rolling, capping layer design, landfill cell construction, and rectification/stabilisation of numerous slip and erosion features. The entire existing capping layer was impact rolled prior to its improvement. Andrew has been heavily involved in the design and construction of this project since early 2011. The project required full time inspections by a geotechnical engineer for a period of 18 months. The project is ongoing.

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- **New Coal Handling Facility, Ovoot Tolgoi Mine, Mongolia**: Geotechnical engineer responsible for investigations and slope stability analyses for a new coal handling facility in the Gobi Desert. Structures included a ROM pad, dump hopper structure and bridge, rotary breaker, four radial stackers, 500 tonne raw coal surge bin, FGX plant, numerous conveyors and transfer buildings, 400 tonne truck load out bin, and associated infrastructure, buildings and roadways. Regular inspections were carried out for earthworks, footings and for cut rock face stabilisation works, including rock bolts and rock fall netting.
- **Heavy Duty Highway through the Gobi Desert, Mongolia**: Geotechnical engineer responsible for detailed geotechnical and traffic load investigations, route alignment assessment and construction material investigations for a proposed 50km dual-carriageway highway, which will extend from the Ovoot Tolgoi Mine (located in southern Mongolia) to the Chinese border. The proposed road alignment extended through extremely variable desert terrain. The design axle load for this project was 27 tonnes, and the design traffic load was in the order of $2x10^9$ ESAs. Our design options included an asphaltic concrete pavement (with polymer modified binders or Superpave HMA), a concrete pavement, and a spray sealed surface.
- **St Ives Former Landfill**: Geotechnical engineer responsible for the periodic slope stability inspections of a former green waste landfill (since 1999), which contained fill batter slope up to 17m high. Investigations completed included deep boreholes to confirm the depth and nature of the landfill, and hazardous ground gas monitoring. Advice on long-term site maintenance and reconstruction of the capping layer has been provided. This project is ongoing.
- **Wyllie Road, Kembla Grange**: Geotechnical engineer responsible for a proposed 37 lot industrial subdivision on the level capping layer of an existing coal washery repository. The repository had been placed up against a hillside, resulting in fill slopes up to 26m high. Detailed investigations included numerous shallow and deep boreholes, long excavator dug trenches on the fill batter slope, detailed slope stability analyses using SLOPE/W, and settlement analyses. Advice was provided on earthworks and building footings. A full scale impact rolling trial was also undertaken.
- **Berths 5 & 6 Glebe Island, NSW**: Geotechnical engineer responsible for the investigation and monitoring of a 315m long distressed seawall. Investigations have included deep boreholes, inclinometer installations and monitoring (since 1998), stability analyses using SLOPE/W, and advice has been provided on stabilisation/reconstruction of the seawall. This project is ongoing.
- **Stabilisation of a Leaking 1000ML 'Prescribed' Dam, Narama Mine, Ravensworth, NSW**: Geotechnical engineer responsible for detailed investigations into the leakage of a DSC 'Prescribed' dam, which includes a 800m long zoned earth fill embankment up to 13m high. The investigation included deep cored boreholes with Packer testing, test pits, and the installation of numerous vibrating wire piezometer and Casagrande piezometers into both the embankment and foundation materials. Analyses included detailed seepage and stability modelling, and detailed design recommendations for embankment stabilisation, including grout curtains and pressure relief wells.
- **Infrastructure Redevelopment at Holsworthy Barracks, NSW**: Geotechnical engineer responsible for the design and construction of 15 dams (embankments up to 5m high), with detailed advice for each dam, including embankment design, earthworks, foundation preparation and clean up, and specifications for earthfill materials and compaction.
- **Liverpool Hospital Redevelopment, NSW**: Geotechnical engineer responsible for the majority of the investigations and inspections for the redevelopment of the hospital since 2003. The redevelopment has included several new buildings, two bridges over the Main Southern Rail line, multi-storey car park and new pavements.
- **Riverbank Stabilisation Works along Wyong River, Wyong, NSW**: Geotechnical engineer responsible for the investigation of two large landslide/regression features along the Wyong River. Geotechnical mapping, borehole investigations, retaining wall analyses using WALLAP, and stability analyses using SLOPE/W were carried out for the geometric and earthworks designs of the remedial works, which included a stabilising berm at one location, and a rock revetment with a timber piled toe wall at the second location.

- **Riverbank Stabilisation Works at Boral Plywood, North Ipswich, QLD**: Geotechnical engineer responsible for the investigation of the riverbank instability (Bremer River) which occurred immediately following the January 2011 floods. One of the landslides was at least 120m wide. Geotechnical mapping, shallow test pits, borehole investigations and stability analyses using SLOPE/W were carried out for the geometric and earthworks designs of the remedial works, which included a stabilising berm.
- **Stability Assessments of Existing Levees within the Kempsey Shire Council LGA, NSW**: Geotechnical engineer responsible for the investigation of several kilometres of levee (five different sites) within the LGA. Geotechnical mapping, test pit investigations, stability analyses using SLOPE/W were carried out for the geometric and earthworks designs of the remedial and/or reconstruction works.
- **Ausgrid Strathfield South Zone Substation, NSW**: Geotechnical engineer responsible for the investigation of a site (for a proposed new substation), which partially overlay a former quarry, which had been backfilled with landfill. Investigations completed included deep boreholes to confirm the depth and nature of the landfill, and hazardous ground gas monitoring. Advice on long-term settlements, earthworks, piled footings and hazardous ground gas control measures has been provided. This project is ongoing.