HWL EBSWORTH
LAWYERS

Our Ref: PNL:ACS:944815

10 August 2022

Sheelagh Laguna
Principal Planning Officer
Department of Planning and Environment
4 Parramatta Square, 12 Darcy Street
Parramatta NSW 2150

By Email

Dear Madam

State Significant Development Application SSD-11606719
Site: Lots 1 & 2 DP 1145808, Lot 2 DP 1247691 and Lot 7 DP 1200048
Submission on behalf of Jacfin Pty Ltd

We act for Jacfin Pty Ltd (***Jacfin***).

We refer to State Significant Development Application SSD-11606719 (***Application***), by which Bingo Industries (***Bingo***) seeks consent to increase the total waste throughput at its Eastern Creek Facility (***Facility***) by 950,000 tonnes per annum (***tpa***) over two stages to a total of 2.95 million tpa, and carry out infrastructure upgrade works across the Site.

Jacfin is the owner of adjacent land to the south of the Site, being the land known as Lot 2 in DP 1274322 (***Jacfin's Land***).

Executive Summary

1. Jacfin submits that the proposed increase in throughput tonnage will have a substantial adverse impact on Jacfin's Land and the amenity of residents in the established suburbs of St Clair and Minchinbury in the immediate vicinity of the Facility. The Facility and Bingo have been the subject of recent regulatory action by the NSW EPA to manage odour impacts in the locality. No increase in throughput tonnage should be approved until ongoing odour impacts have been completely mitigated.

2. **Air Quality** - The air quality impact assessments submitted in support of the Application rely on flawed modelling, such that the Application has under predicted the actual air quality impacts. The impact of the Application on Jacfin's Land and adjacent residential areas cannot be properly assessed. The Application should be refused on this basis.

3. **Odour and Leachate Management** - The disparity between the actual and predicted leachate levels on the Site has not been addressed by the Application.

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Given that the Application does not propose any changes to the leachate treatment system, the leachate levels will likely result in continued odour impacts. The leachate levels are not compliant with current EPA guidelines. Given existing inadequate leachate management arrangements, the Application should be refused on this basis.

4. **Waste Management** - The Application contains a number of inconsistencies in relation to waste management that require clarification, including the relationship between the Application and the adjoining proposed Next Generation energy from waste facility.

5. **Traffic and Transport** - The traffic impacts of the Application have not been adequately addressed in the Traffic Impact Assessment prepared by Traffic Planning Partnership dated 9 February 2022 (***TIA***). A number of claims in the TIA are based on flawed and under-represented traffic demands at the Site. In the absence of a revised traffic impact assessment, the Application should be refused.

Expert Reports

In support of this submission, Jacfin has engaged the following consultants to undertake independent expert assessment of the Application:

1. SLR Consulting (***SLR***) - Traffic and Transport;

2. SLR - Waste Management;

3. Atmosphere Science Global (***ASG***) - Air Quality; and

4. Gilbert and Sutherland (***G&S***) - Odour and Leachate Management.

The experts reports are **attached** and referenced below.

Air Quality

The ASG report indicates that there are a number of deficiencies in the air quality assessments and modelling submitted in support of the Application. These deficiencies are in both the meteorological model, which has been used to assess atmospheric processes, and the dispersion model, which has been used to predict pollutant dispersion impacting the Site.

The Air Quality Impact Assessment prepared by EMM Consulting dated June 2022 (***2022 AQIA***) submitted in support of the Application relies on the same meteorological model that was used in the Air Quality Impact Assessment prepared by Ramboll for the previous Modification 6 application(***Mod 6 AQIA***), which was approved in April 2020.

As detailed in the ASG report, due to the deficiencies of the model, a number of atmospheric conditions may have been underestimated, and the resulting model predictions of particulate matter (***PM***) are likely inaccurate.

The dispersion model referenced in the 2022 AQIA uses only 576 gridded receptors to model concentrations of odour and PM over an area of 6km^2, which is not consistent with

best practice. Further, receptors have not been placed on nearby sensitive land, including Jacfin's Land. Concentrations of odour and PM are therefore likely to have been missed or inaccurately modelled.

The 2022 AQIA states that the second stage of the Application will release 66% more $PM_{2.5}$ compared to levels currently released. However, the $PM_{2.5}$ results for sensitive receptors for the second stage show a smaller impact than the current approved operations. The 2022 AQIA does not justify these findings which appear to be unsupported.

The 2022 AQIA also states that the amount of waste to landfill produced due to the throughput increase is estimated to be ~65,250 tpa. However, it is unclear how much of this tonnage will contain asbestos containing material (***ACM***) or odour producing material. Despite human health risks associated with ACM, the airborne risk of asbestos fibres is not addressed by the Application.

Notwithstanding the Site's extensive history of odour complaints made by the surrounding residential community, the 2022 AQIA does not provide any odour mitigation management plan and does not consider 'worst case' conditions, such as increased rainfall or failure of the bio gas flares. Given the lack of detailed information provided in the 2022 AQIA, the odour model results cannot be verified and the potential impacts cannot be assessed.

Overall, the ASQ report suggests ground level concentrations of key pollutants including PM and odour have been under predicted, and the air quality impacts of the Application cannot be meaningfully assessed.

In the absence of a full assessment of air quality impacts on residential and neighbouring populations, the Application should be refused.

Odour and Leachate Management

As mentioned above, the Site has an extensive history of excessive leachate and odour generation, which has resulted in a substantial number of odour related public complaints being made to Bingo and the NSW EPA, and the issue of Clean Up Notice 3500173.

Despite this, Bingo is seeking approval for an annual throughput increase of almost 50% operational capacity with no proposed changes to the landfill operations or leachate management of the Facility operating at the Site. This is likely to exacerbate the existing odour impacts experienced at Jacfin's Land and surrounding residential communities.

As detailed in the G&S report, the Facility is generating more leachate than was originally predicted by the Leachate Collection System Concept Design prepared by Environmental Resources Management dated August 2008 (***ERM Report***) for the original application.

The ERM Report estimated that leachate levels in the landfill could be limited to 3m above the pit base given the Facility's leachate pumping system. However, in 2019 and 2020 the level of leachate was reported as 46m and 78m above the pit floor respectively, which is in excess of the volumes predicted. Given increased rainfall in 2021 and 2022, it is likely that these volumes have increased further.

The disparity between actual and predicted leachate levels in the landfill has not been addressed in the Application and, as no changes are proposed to the leachate treatment system, the leachate level in the landfill will remain excessive.

Given excessive levels of leachate and limited treatment/disposal capacity, there is a risk to the receiving environment through leachate interactions with local and regional groundwater. Although groundwater management concerns have been raised, they have not been addressed in the Environmental Impact Statement prepared by Bingo dated 18 May 2022 (***EIS***). Accordingly, a greater degree of groundwater investigation and assessment is required.

The Application does not comply with current EPA guidelines for landfilling in NSW, being the EPA's Environmental Guidelines, Solid Waste Landfills, Second Edition, 2016 (***2016 EPA Guidelines***), which requires:

> *Leachate in excess of the waste's field or holding capacity should be continuously withdrawn from the cell to ensure that the depth of leachate over the liner does not exceed 300 millimetres or some other maximum level justified in the design of the cell. The leachate level should at all times be below the lined capacity of the cell.*

As discussed above, the level of leachate reported in 2020 was 78m above the liner, with further increases likely in 2021 and 2022. Although "some other maximum level" may be justified, it would be difficult to justify a design which enables these levels to accumulate within the waste mass. Accordingly, it is likely that the depths of leachate reported at the Facility do not comply with the 2016 EPA Guidelines.

In the absence of a further detailed assessment of groundwater impacts, leachate levels and an appropriate management regime, the Application should be refused.

Waste Management

The EIS claims that there is no relationship between the proposed expansion of waste throughput at the Facility and The Next Generation's (***Next Gen***) SSD Application 8477614 which seeks approval for an Energy from Waste Facility (***EfW Facility***) at Eastern Creek.

This is inconsistent with the documentation provided by Next Gen in support of its application. For example, the TNG Feedstock Review prepared by MRA Consulting Group dated 28 May 2021 states that Bingo will supply feedstock through a conveyor belt *directly to* the EfW Facility.

There are a number of other inconsistencies in the EIS in relation to waste management including waste flows and sources of waste accepted at the Facility, and agreements with third parties to supply product streams for use offsite, which will require clarification and further investigation.

Traffic and Transport

The TIA submitted in support of the Application does not adequately address the traffic impacts of the Application, and a revised traffic impact assessment is required.

Existing traffic generation at the Site, as reported by the TIA, does not appear to be based on actual surveyed traffic demands and instead appears to be based on a flawed assessment which is likely to under-represent peak traffic demands.

Further, the EIS refers to a number of developments proposed in the surrounding area, however the cumulative traffic generation impact of these proposed developments has not been accounted for in the TIA. In this regard, the actual traffic demands of the Application are likely to be higher than those reported in the TIA.

SLR's review of the SIDRA intersection assessment documented within the TIA indicates that the Wallgrove Road/Wonderland Drive intersection is over capacity for current conditions in pm peak hour periods, and will require an upgrade to accommodate additional traffic demands.

In addition to the concerns raised by SLR, the Application has not satisfied or sufficiently addressed the following traffic assessment requirements of Transport for NSW and Blacktown City Council:

1. the Application does not provided details of the maximum number of vehicles per day and per annum generated by the Application and how these will be monitored to ensure ongoing compliance; and

2. the Application does not propose upgrade works to any classified roads, despite the existing and expected constraints experienced at the Wallgrove Road and associated intersections.

Accordingly, a revised traffic impact assessment is required to address the issues identified above. In the absence of a revised assessment addressing these issues, the Application should be refused.

Yours faithfully

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Eastern Creek Recycling Ecology Park, Bingo Industries Pty Ltd, Eastern Creek

Expert Report
Identification of Key Air Quality Issues on Jacfin owned laned by the Increase in Throughput

[HWLE-Matter. C0187470.944815]

Attention:
Jacfin Pty Ltd

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Report By:
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August 2022

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Executive Summary

ASG has been engaged by HWL Ebsworth Lawyers on behalf of Jacfin Pty Ltd (Jacfin) to conduct a review of the Environmental Impact Statement (EIS) and related air quality documents which were submitted by Bingo Industries in July 2022 in respect of the Eastern Creek Facility throughput increase on Application SSD 11606719.

Bingo Industries Pty Ltd is seeking consent to increase the total waste throughput at the Eastern Creek facility over two stages to a total of 2.95 Mtpa as well as carry out infrastructure upgrade works across the site. The current approved operations is 2.0 Mtpa where 1 Mtpa can be sent to landfill, which does not change with the new Proposal.

ASG identifies the following shortcomings and deficiencies of the Air Quality Assessment for the Proposal.

- The AQIA has misinterpreted the NSW Approved Methods categorisation of a 'Sensitive Receptor'. The AQIA has identified both residential receptors and commercial receptors as being 'sensitive in nature' but has applied different odour assessment criteria to both. In particular commercial receptors are assessed as the equivalent of a single residence for odour of 7 ou while the residential receptors are assessed at 2 ou. Nowhere is this supported in the Approved Methods. The correct odour assessment criteria for all receptors is 2 ou.

- The AQIA failed to consider the proposed NEPM AAQ measures for $PM_{2.5}$ in 2025 which see a reduction of the 24-hour assessment criteria of 25 $\mu g/m^3$ to 20 $\mu g/m^3$ and an annual reduction of 8 $\mu g/m^3$ to 7 $\mu g/m^{3.}$ At the 2025 NEPM criterion there will be significantly more exceedances than currently reported in the documents.

- The meteorological model is unchanged from the Ramboll, 2018 AQIA for the Approval of Modification 6. The model is of a very poor standard and will have a direct result on the model predictions of particulate matter (PM) and odour. In brief, the model setup, model inputs and key model settings have many short comings in them. In addition, the model is so coarse that the pit is and surrounds are represented as a flat surface. The wind rose at the site is incorrect and completely misses out on the channelled southwest and north-northwest dominant flows known to affect the region. In addition the number of surface calms are under estimated. There is no model evaluation. No files are provided for review and there are inconsistencies in the report that do not make sense, such as the use of BIAS, vertical extrapolation, and the way TAPM data was used in CALMET.

- The modelling has not considered any 'pit effects' for any air pollutant. The pit is of substantial enough size at 430m (wide) x 700m (long) x 150m (deep) to alter the dispersion of pollutants within and outside the pit. Altered meteorology, the long orientation of the pit with respect to the dominant winds, and considering the pit is a significant air pollution source due to the activities within it means that the pit is responsible for much higher levels of pollution within the first kilometre or so around it than the emissions or modelling reflects.

- The dispersion model setup is poor. Only 576 gridded receptors were used to develop the concentrations of odour and PM over an area of 6km x 6km with 250m spacing between them. There are no receptors placed on nearby sensitive land such as that owned by Jacfin. At a minimum receptor should be spaced 25m apart for the first 1km or so then increasing

resolution with increasing distance. The consequence of a coarse receptor grid as used in the AQIA model is to miss the peak concentrations entirely as peak occurrences can easily fall between receptors. In addition coarse receptor grids assist in the development of inaccurate interpolated contour plots rather than plots developed on actual data.

- The AQIA has not provided any detail on the source characterisation (coordinates, area of each source, initial vertical and horizontal dilution assumed and height of sources). Therefore, it is impossible to conduct a review or determine if the modelling has been done to a high degree or not. Small modifications to these parameters can make significant downwind changes in ground level concentrations. In addition there is insufficient information pertaining to the technical assumptions, inconsistencies and errors in the report. The dispersion model cannot be relied upon to provide a robust and meaningful impact on the air pollution impacts of the Proposal on nearby owned Jacfin land.

- Cumulative effects of PM have not been considered. It is normal in air quality assessments to take into account; the Project impact + cumulative (from surrounding neighbours) + Background. The AQIA has only taken into account Background and their own Project site.

- Table 3.2 of the AQIA shows that Stage 2 operations (The Proposal) **will release 66%** more $PM_{2.5}$ (5,675 kg/annum) compared to current approved operations (1,915 kg/annum), and yet the $PM_{2.5}$ results for all sensitive receptors shows a smaller impact than the current approved operations. The AQIA has not provided any convincing justification to support the findings of the much lower $PM_{2.5}$ results in Stage 2. As a result the $PM_{2.5}$ findings are unacceptable.

- The AQIA has attempted to take into account the a 'peak theoretical day' to try and account for those days when the throughput of waste is higher than average that has been assumed in the modelling based on yearly tonnage. A scaling factor of 1.3 was used to scale the PM concentrations. However, the scale factor does not take into account any days when the waste received is greater than 30% above normal. A better way to estimate this might be on past empirical records.

- In addition to the above, the AQIA has failed to take into account the significant practical operations involving storage, stockpiling, transferring, unloading and handling of higher-than-normal daily waste loads. Storage times could be longer, additional stock piling may be required. Therefore, there is considerable risk associated with higher-than-normal daily loads that has not been taken into account which have underestimated air pollution impacts.

- From Table 3.1 of the AQIA the amount of waste to landfill with the additional throughput of 950,000 tpa is estimated to be ~65,250 tpa. It is unclear how much of this tonnage will contain asbestos containing material (ACM) or, potential odour producing material. However, it is expected that the amount of ACM will increase. Neither, the human health risk report nor the AQIA made any mention of the airborne risk of asbestos fibres. Exposure to asbestos fibre is a serious health concern, therefore, the risks and mitigation of another fire[1] should be a key component of the EIS and related documents.

- The AQIA states that the odour model is conservative, and yet it has not taken into account daily high fluctuations in loads and the practical consequences of this, such as 'aging waste' or additional stockpiling, handling of waste etc. In addition, the Proposal is allowed to stockpile up to 20,000 m^2 of green waste at any one time, while modelling has assumed just 3,200 m^2. Of the 65,250 tpa of waste to landfill, some of this will be odour producing and yet

[1] 4 February 2020. Fire broke out at Bingo Industries Landfill. Residents reported 'toxic plastic and chemical smells'

none of this has been considered in the AQIA odour model. Further, it is not clear whether the NSW Approved Methods Peak to Mean Factor of 2.3 ou has been scaled to all concentrations. There is no mention of the Peak to Mean Factor in the AQIA report which suggests the odour concentrations should be higher than those reported in the AQIA.

- The odour assessment has not considered 'worst case upset emissions' (which may be due to failure of the bio gas flares, increased rainfall, decomposing green waste etc), nor has the AQIA provided any odour mitigation management plan. This is important especially considering the Bingo's poor history of odour complaints and the lack of any meaningful separation distances between the facility and the community.

Based on these findings the Air Quality assessment and air modelling presented in the AQIA in support of the Proposal is not of a sufficiently high standard to conclude that Jacfin's land will not be negatively impacted. All of the issues and concerns raised point to the AQIA model and air assessment has underpredicted the actual impacts of air pollution from the Proposal. Since the AQIA model already shows exceedances of PM_{10}, $PM_{2.5}$ and odour, a more robust accurate model is likely to substantially increase the number of exceedances of these pollutants.

1. Introduction

1.1 Overview

ASG has been engaged by HWL Ebsworth Lawyers on behalf of Jacfin Pty Ltd (Jacfin) to conduct a review of the Environmental Impact Statement (EIS) and related air quality documents which were submitted by Bingo Industries in July 2022 in respect of the Eastern Creek Facility throughput increase on Application SSD 11606719.

1.2 Background

Bingo Industries Pty Ltd (Bingo) seeks consent to increase the total waste throughput at the Eastern Creek facility over two stages to a total of 2.95 metric tonnes per annum (Mtpa), and carry out infrastructure upgrade works across the site.

An EIS was prepared along with supporting documents on behalf of Dial-A-Dump (EC) (DADEC) Pty Ltd (the Applicant) (as owned by Bingo) to support a State Significant Development (SSD) application in accordance with Part 4, Division 4.7 of the Environmental Planning and Assessment Act 1979. The existing Eastern Creek Recycling Ecology Park (REP) (formerly known as the Genesis Waste Management Facility) is currently licenced to accept non-putrescible construction and demolition (C&D) and commercial and industrial (C&I) waste for landfilling and operation of two materials processing centres (MPCs) to recover recyclable material from the C&D waste and C&I waste streams. The Applicant is seeking approval to optimise the existing Eastern Creek REP by increasing the throughput from the current two million tonnes per annum (Mtpa) by an additional 950,000 tonnes per annum (tpa), and by optimising internal infrastructure such as roads and stormwater ('the Proposal').

It is proposed to develop the Proposal in three stages:
Stage 1: Initial throughput. Stage 1 would comprise 500,000 tpa of additional throughput to be received at the Eastern Creek REP.
Stage 2: Internal site optimisation. Stage 2 would facility the remaining throughput increase of an additional 450,000 tpa to be received and processed across the Eastern Creek REP as well as some roading infrastructure and re-routing.
Stage 3: Installation of supporting infrastructure. Stage 3 would compromise the redevelopment of the north-eastern corner of the Proposal site.

The REP comprises a number of resource recovery facilities and activities including:

- Two materials processing centres known as Materials Processing Centre 1 (MPC1) and Materials Processing Centre 2 (MPC2) which predominantly process dry construction and demolition (C&D) and commercial and industrial (C&I) waste.
- A segregated materials area (SMA) used for the receipt, processing dispatch and stockpiling of inert construction and demolition materials, such as sand, dirt, aggregate, concrete, bricks and asphalt.

- The proposal of an additional 950,000 tpa would consist of predominantly dry C&D and C&I waste

There are three aspects to air quality in the AQIA, PM (comprising of PM_{10}, $PM_{2.5}$ and TSP), odour and asbestos. The key pollutants of concern during the operation of the facility are:

- fugitive dust and odour generated from waste receipt, handling, processing and product dispatch;
- odour from green waste processing, landfilling, leachate management and composting; and
- asbestos waste receiving, handling, storage and disposal

Modelling was conducted using the CALPUFF suite of models. No control input files have been viewed or tested.

An Air Quality Impact Assessment (AQIA)was conducted by EMM in June 2022. ASG has reviewed the following documents relevant to Air Quality:

- Bingo Industries Environmental Impact Statement dated June 2022.
- EIS Appendix K – Air Quality Impact Assessment prepared by EMM Consulting dated June 2022.
- Appendix C – Air Quality Impact Assessment, Genesis Xero Waste Facility, Modification 6 Ramboll, 2018.

1.3 Scope of This Expert Report

ASG has conducted a review of the air quality that was prepared for Bingo in support of the additional throughput of material, and has considered all the relevant documents. ASG's principal role is to consider whether the AQIA adequately addresses the air quality concerns and risks, as well as highlight whether there are any other issues that have not been addressed in the AQIA and EIS. On this basis, the following has been considered:

- the appropriateness of the modelling carried out in support of the Proposal;
- the methodology and inputs used in the dispersion modelling;
- the analysis of the results in relation to the NSW EPA assessment requirements; and
- any other issues outstanding in relation to the air quality and odour impact assessment for the Proposal.

2. General Concerns

2.1 AQIA Incorrectly Misinterprets the Meaning of a 'Sensitive Receptor'

The AQIA defines a sensitive receptor as 'a location where people are likely to work or reside; this may include a dwelling, school, hospital, office or public recreational area'. The AQIA points out that 'particularly sensitive receptors are 'residences, schools and hospitals.

The AQIA has presented the modelling results separately for residential and commercial receptors stating the following reasons:

1. The adjacent commercial receptors are less sensitive to air pollution than residential receptors because the exposure criteria of PM_{10} and $PM_{2.5}$ expressed as 24-hour and annual averages are not applicable to commercial receptors (because workers have an 8-hour day).

2. Exposure to air pollution for sensitive population groups (children and elderly) is less likely to occur at commercial receptors.

However, the AQIA has misinterpreted the definition of a sensitive receptor as described in the Approved Methods. The Approved Methods is very clear that a sensitive receptor is a "location where people are likely to work or reside" which may include a dwelling (where someone might reside for 24 hours) and an office (where they might only be for 8 hours a day). In addition, the Approved Methods recognises a public recreational area as a sensitive receptor even though people might only be exposed for an hour or two a day.

The Approved Methods, makes no delineation between a Residential area and a Commercial area where one area is considered sensitive and the other is not. Therefore, all the receptors identified in the AQIA should be considered equal 'sensitive receptors' and should be assessed at the same assessment criteria, not two different criteria as determined by the AQIA.

The definition of a sensitive receptor includes anyone who is at a heightened risk of negative health outcomes due to exposure to air pollution. Therefore the term 'sensitive receptor' is not just designated for 'children and the elderly' as the AQIA incorrectly suggests.

Incorrect misinterpretation of the guidelines around 'sensitive individuals and locations and analysis of the results around two different assessment criteria is a key shortcoming of the AQIA.

2.2 AQIA did not Consider Future (2025) Changes to Particulate Matter Assessment Criteria

The AQIA states that modelling work conducted has been assessed in accordance with the NSW Approved Methods, and that the AQIA has demonstrated that the Proposal will comply with the relevant regulatory framework specifically the Protection of the Environment Operating Act, 1997 (POEO Act) and the POEO (Clean Air) Regulation 2010. The AQIA states that the Statutory

framework for managing air emissions in NSW is provided by the POEO Act[2], of which the primary regulations for air quality made under the POEO Act are:

- Protection of the Environment Operations (Clean Air) Regulation 2010[3], and
- Protection of the Environment Operations (General) Regulation 2009[4]

However, the AQIA has not taken into consideration the proposed 2025 changes to the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM) approved by the National Environment Protection Council (NEPC) in April 2021. While the new 2021 standards do not make any significant changes to the PM_{10} and $PM_{2.5}$ assessment criteria. The NEPC agreed to commence a further review of PM_{10} and $PM_{2.5}$ in conjunction with O_3, NO_2 and SO_2 standards in 2025. The new proposed 2025 standard for $PM_{2.5}$ will see a decrease from 25 µg/m^3 to 20 µg/m^3 for the 24-hour average and from 8 to 7 µg/m^3 for the annual average. These proposed 2025 NEPM standards are summarised and compared to the standards in the AAQ NEPM in Table 1 below.

Table 2-1. Comparison between the existing 2021 AAQ NEPM PM criteria and the proposed 2025 criteria for PM.

Pollutant	Averaging Period	AAQ NEPM 2021 Standard	Proposed AAQ NEPM 2025 Standard
$PM_{2.5}$ (µg/m^3)	Annual	8	7
	24-hour	25[a]	20[a]
PM_{10} (µg/m^3)	Annual	25	-
	24-hour	50[a]	-

[a] not to exceed the limit

The AQIA did not take into consideration the proposed 2025 $PM_{2.5}$ criteria. There are already exceedances of the $PM_{2.5}$ 24-hour criteria at both residential receptors and commercial receptors for Stages 1, 2 and 3 at the current NEPM AAQ. The new proposed NEPM 2025 $PM_{2.5}$ standard will see an increase in the number of exceedances that have not been reported on.

2.3 The AQIA Incorrectly Assessed the Model Results with Two Different Odour Assessment Criteria Values

The AQIA states that the correct odour assessment criteria is 2 ou applicable to the residential areas surrounding the Project Site and that 7 ou is the applicable assessment criteria to the nearby neighbouring commercial/industrial receptors. The AQIA justified the use of 7 ou as the correct assessment criteria because it is consistent with the AQIA completed for Modification 6 of the Eastern Creek REP, conducted by Ramboll in 2018.

[2] http://www.legislation.nsw.gov.au/maintop/view/inforce/act+156+1997+cd+0+N

[3] http://www.legislation.nsw.gov.au/maintop/view/inforce/subordleg+428+2010+cd+0+N

[4] http://www.legislation.nsw.gov.au/maintop/view/inforce/subordleg+211+2009+cd+0+N

This is incorrect. The Approved Methods has a sliding scale approach in order to assess the exposure criteria for a complex mix of odorous pollutants, as per Table 2-2. For an urban population with over 2000 people the odour assessment criteria is 2 ou. For a single rural residence the impact criteria is 7 ou. The AQIA has determined that all the nearby sensitive receptors should be assessed at 7 ou, the same criteria as for a single isolated rural residence.

Table 2-2. Impact assessment criteria for a complex mixture of odorous air pollutants (nose-response-time average, 99th percentile. (NSW Approved Methods, Table 7-5).

Population of affected community	Impact assessment criteria for complex mixture of odorous air pollutants (ou)
Urban area (≥ 2000) and/or schools and hospitals	2.0
~500	3.0
~125	4.0
~30	5.0
~10	6.0
Single rural residence (≤ 2)	7.0

Experience gained through multiple odour assessments from proposed and existing facilities in NSW indicates that odours in the range of 5 – 10 ou are generally considered to be the starting level for odour complaints and that an odour performance goal of 7 ou is likely to represent the level below which 'offensive' or 'objectionable' odours should not occur for an individual with a 'standard sensitivity' to odours.

Odour performance goals need to be designed to take into account the range in sensitivities to odours within the community, and provide additional protection for any individual with a heightened response to odours. As the affected population size increases, so does the number of odour sensitive individuals, which suggests more stringent goals are necessary. Where a number of factors (population density, cumulative impacts, anticipated odour during adverse meteorological conditions and community expectation s of amenity) simultaneously contribute to make an odour 'offensive' or 'objectionable', an odour goal of 2 ou at the nearest sensitive receptor is appropriate which generally occurs for affected populations equal or above 2000 people.

In addition given the history of odour complaints from the nearby residents, the local community and neighbours, and the lack of a 'buffer' distance between the Project site and the nearby residential areas, an odour assessment criteria of 2 ou applicable to all sensitive locations beyond the plant boundary should be the assessment criteria for the Proposal.

2.4 The AQIA Does not Include any Sensitive Receptors on Future Land Development Sites

The AQIA does not include any 'receptors' on Jacfin land or on any future planned development sites. With the coarse receptor grid used in the AQIA model it is not even clear if the Jacfin land is even represented by any receptor.

3. Meteorological Model Concerns

3.1 The Meteorological Model Reported in the AQIA is the Same as that Used by Ramboll in 2018, with no Improvements

The AQIA used the same meteorological model as Ramboll in 2018 when the site was seeking to increase the hours of operation and increase the annual landfill cap limit of 700,000 tpa to 1,000,000 tpa. No improvements to the meteorological model were made and the AQIA refers to the Ramboll 2018 report for model evaluation and summary.

ASG in Section 3.2 Meteorological Modelling Concerns in the Report titled; 'Final-698184073-Review of Air Quality Genesis Waste 20 January 2020' summarised the Ramboll 2018 Meteorological Model as follows;

'***In summary, the meteorological model is of a poor standard, and the evaluation is also poor. The meteorological model could be significantly improved from what has been provided in the AQIA. The meteorological data is the most important input into the model and will have a direct result on the model predictions'***

This summary statement is still valid. The following concerns with the meteorological model are listed below;

3.1.1 The Air Pollution Model (TAPM)[5] model was used but not evaluated.

Hourly gridded, 3-dimensional data from TAPM was used to provide CALMET upper air data. Whilst the grids and options chosen for TAPM are appropriate, the following issues arise with the use of TAPM in the AQIA model.

1. The AQIA used several observational stations in TAPM to force the wind field toward the observations. This is not recommended practice for the following reasons:

    a) The TAPM model source code is a black box, and apart from the developers no-one can 'see' inside the model. Therefore, it is impossible to understand how TAPM manages conflict between the observed data and the numerical solution when winds are opposing each other. There is no literature, published papers or guidance on this. Observations should be included into CALMET, which was developed to process observation data.

    b) The AQIA has not provided any detail on how each observation station was weighted within TAPM. (TAPM requires the user to determine in kilometres how much weight to apply to individual surface stations in the horizontal and vertical direction). The stations could be completely incorrectly weighted and no-one would know about this.

[5] CSIRO Division of Atmospheric Research. Melbourne, Australia.

c) The TAPM 3-dimensional winds and temperature data are used as input to the CALMET model. CALMET may not be able to recover the winds from a poor TAPM model setup.

2. The output of TAPM was not evaluated. It is usual for a report such as the AQIA to include time series, wind roses and scatter plots of meteorological variables. Sydney International Airport is located approximately 40 km due east of the facility which records 6 hourly radiosonde profiles. Such wind and temperature vertical profiles from Sydney Airport should have been used to evaluate the performance of TAPM at 20m, 30m and 50m above the surface over the whole modelling year and isolated events. Alternatively, Sydney Airport radiosonde data should have been used to develop the upper air winds. Use of observed/measured data from Sydney Airport or, well evaluated TAPM data would have provided some confidence in the modelling that was conducted.

3. The AQIA states that it uses gridded 3 dimensional data from TAPM model as input into CALMET. The innermost TAPM nest is 25 km x 25 km. However, the CALMET model domain is 60 km x 60 km, therefore it is not possible to have used gridded 3D data into CALMET. In order for gridded TAPM 3D gridded data to have been used as per Ramboll 2018 and the AQIA, the TAPM innermost nest would have to be a minimum size of 60 km x 60 km. Therefore, it is not clear how the TAPM data for upper air was used.

3.1.2 The AQIA model failed to include all the available relevant meteorological data.

The AQIA model did not include data from:

1. Prospect meteorological station; and
2. Badgery Creek meteorological station.

Two key meteorological stations situated 10km due east and 10km to the southwest from the Project site, respectively. The AQIA cited the reason for not doing so as they wanted to compare the model output data with observations as a means of evaluation. However, the consequence of not including these nearby stations is an inadequate surface wind field that could have been improved through the inclusion of this data.

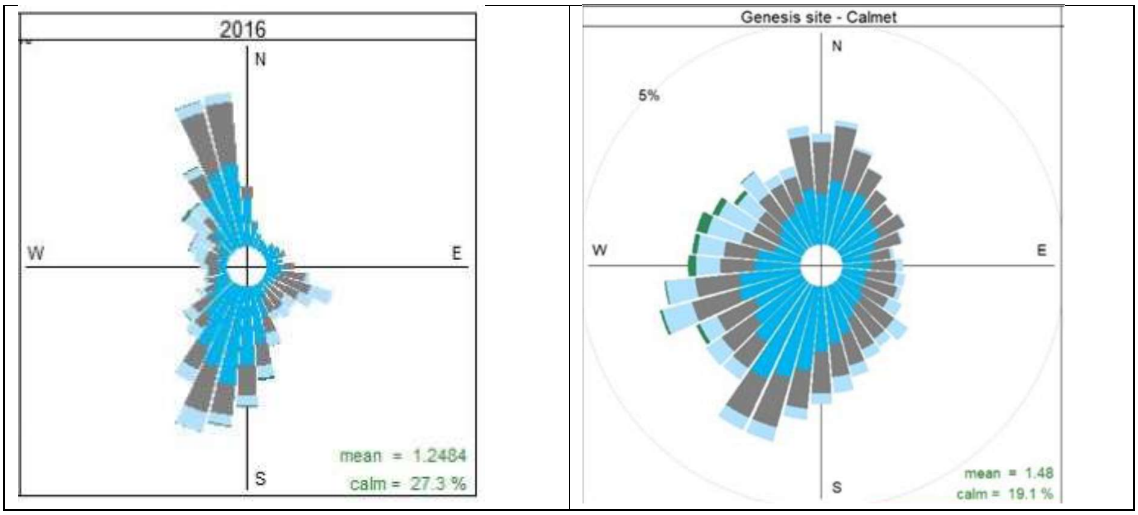
3.1.3 CALMET Model Setup is Inadequate

1. The CALMET model domain size at 60 km x 60 km is too large and is inappropriate for the application site. In order to use such a big model domain the AQIA has had to compromise on using a coarse grid resolution of 500m, instead of a much finer grid resolution of between 150m and 250m. The consequence of such a coarse grid resolution is that the land will appear flat, the pit will disappear and the land use will be inaccurate.

2. The wind regime around the Project site is influenced and directed by the local topography. This is the case as can be seen by the St Mary wind rose in Figure 3-1, which shows topographic channelling as the site is located in a north-south valley. The Project Site is located approximately 5km to the east of St Mary's and is also surrounded by the same topography as St Mary's and located within a small north-south valley. Yet, the Project site

wind rose is uniform with winds coming from all directions. The net result of this is that the winds at the Project site do not reflect the terrain around it, and the uniformity of the winds means the pollution load is spread 360 degrees around thereby decreasing the pollution loads and concentrations in the direction of the dominant occurring winds.

Figure 3-1. ST Mary's OEH annual 2016 wind rose (left) compared to the AQIA predicted wind rose at the Project site (rhs). The Project site wind rose should be much more similar to St Mary's than shown.



3.1.3.1 *Calm and Light wind events*

3. The number of predicted calms (winds < 0.5 m/s) at the Project site have been underestimated in the AQIA model by at least 7-10%. Figure 4-5 of the Ramboll, 2018 report which compares the predicted wind rose at Badgery creek with observations shows that Badgery Creek records 7.4% calms whilst AQIA model at the same location predicts 0 calms. (Badgery Creek data has been verified from the BOM data, 2013-2015).

4. In Figure 4-6 of the Ramboll report the predicted winds at the Project site are compared with Prospect weather station, 8km to the east. Figure 4-6 shows that the actual data processed in the making of the wind rose, automatically produces a record of the calms in that data set. The program recorded 0% calms at the Project site and 0.1% calms at the Prospect weather station. However, the report contradicts the information on Figure 4-6 and states that the Project site has 19% calm versus Prospect station which has 10% calm. ASG has been able to confirm that the BOM Prospect site does record 10% calms from data examined from 2013 – 2015.

   Figure 4-5 and Figure 4-6 confirm that the AQIA model does not predict any calm wind events at the Project site, even though the nearby observation stations record at least 10% of an entire year is calm. Therefore, at a minimum the Project site has 10% calm events which have not been modelled. The consequence of underpredicting the number of light wind events is to underestimate the predicted ground level concentrations.

5. Figure 4-8 of the Ramboll 2018 report shows the atmospheric stability classes per day. The curve shows a normal diurnal pattern of unstable conditions during the day and stable conditions during the day. But, the plot shows almost no neutral conditions and an unusually high number of stable conditions. These findings are a consequence of using the TAPM model to derive the cloud cover which is then used to calculate the sensible heat flux. Cloud parameters should have been derived from observation stations. There are at least three regional airports in the area that record hourly cloud cover and would have provided much greater accuracy for the stability categories over the facility.

6. The CALMET model settings are incorrect. The AQIA and Ramboll (2018) state that they vertically extrapolated the 10m surface winds (IEXTRP = -4 in Appendix A in AQIA and Appendix 2 in Ramboll, 2018) and yet the BIAS parameters that describe how vertical extrapolation was done reflects zero for all vertical levels. Therefore, contrary to the AQIA understanding, no vertical extrapolation of surface winds was conducted.

7. The CALMET model settings (RMAX1) which represents the 'maximum (distance km) radius of influence for each observation station at the surface was given a value of 10km. This weighting means that individual stations have a maximum distance weighting of 20km which means significant overlap. This in conjunction with a 'flat' meteorological domain (due to the coarse grid resolution) means stations that should not influence the Project Site are being used at the Project site. The incorrect 'uniform' wind rose is a consequence of this.

3.1.3.2 The AQIA Model evaluation is weak and incomplete

The only evaluation of the meteorological model winds was a comparison of an annual surface wind rose between CALMET and Badgerys Creek, and CALMET and Prospect in the Ramboll, 2018 report. The AQIA did not conduct any further model evaluation and simply referred to the Ramboll, 2018 report (Section 4) for model evaluation.

At the request of the EPA in its November 2018 letter, Ramboll, 2018 conducted a statistical analysis in the Revised Response to Submissions for Modification 6 in Table A.1. The AQIA did this by comparing the predicted winds and temperature at the site of the Prospect weather station. However, statistics of the type that were used in the AQIA are traditionally used for comparing many co-located points from numerical weather models with surface observations and are not suited for one-on-one comparisons. Regardless, the results showed that the wind speed was roughly similar (as expected over such a short distance), but the wind direction bias and gross error showed that the AQIA model was not comparable with the data.

At a minimum, an evaluation of the models should have included spatial wind field plots, time of day wind roses, and time series and scatter plots of wind speed, wind direction, temperature, RH, pressure, solar radiation, Monin Obukhov length scale, stability, friction velocity, mixing height. This information is necessary, especially from a reviewer's perspective as it provides key information on whether the meteorological model has been appropriately developed or not. Further, it also provides a

degree of confidence that the work in the AQIA is robust and reasonably accurate. The AQIA does not provide any confidence that the model is either robust or accurate.

4. Dispersion Model Concerns – Particulate Matter, Asbestos and Odour

4.1 Overview

Chapter 3, of the AQIA details the three modelling scenarios for particulate matter (PM) modelling, as follows;

- Approved operations (1 Mtpa of landfill and 1 Mtpa for resource recovery – total of 2 Mtpa)
- Stage 1 operations (1 Mtpa of landfill and an additional 0.5 Mtpa for resource recovery – total 2.5 Mtpa)
- Stage 2 operations (1 Mtpa of landfill and an additional 0.45 Mtpa for resource recovery – total 2.95 Mtpa)
- Stage 2 construction, which involves removal of 1.2 Mtpa from the existing earth bunds in the NE and SW corners of the site. Emissions for Stage 2 are included with the Stage 1 operations scenario.

The AQIA developed emission inventories for; wheel generated dust; trucks unloading waste at MPC1, MPC2 and SMA; waste sorting handling and conveying; processing (crush screening and shredding) at the SMA; wheel generated dust from trucks travelling into the landfill; unloading waste at the landfill and handling, spreading and compacting; loading product trucks at the SMA; wind erosion from exposed ground (landfill and SMA) and; diesel emissions from onsite plant and equipment.

Fugitive dust emissions were quantified using US EPA AP-42. Dust emissions factors developed by the US EPA (AP-42) were applied in the AQIA to estimate the amount of PM and dust produced by each activity. The modelling developed emission rates for TSP, PM_{10} and $PM_{2.5}$. The emission rates for TSP were also used to estimate dust deposition rates.

The following concerns are noted.

4.2 Dispersion Model Setup

4.2.1 Receptors

In addition to the 65 residential sensitive receptors and the 8 commercial sensitive receptors, Section 2.4.3 of the AQIA provided information on the additional Cartesian grid of receptors used in the modelling, which are primarily used for creating the isopleth contour plots. The AQIA provided information as to the spatial extent of the receptor network (6 km x 6 km centred over the pit), and with a grid interval spacing of 250m between each receptor point. The total number of Cartesian receptor points is 576.

Receptors are important as they are points on the ground where concentration is computed. Ground level concentration is only computed at receptor points. In the case of the AQIA this every 250m.

It is best practice that modelling assessments include at least 3,000 – 6,000 individual receptors. This includes a detailed set of receptors around the boundary of the plant as well as receptors spaced every 25m for at least the first kilometres from the source, thereafter increasing in horizontal resolution with increasing distance. With only 576 receptor points on the model domain the isopleth curves can be

inaccurately placed by 250m. This is because the plotting program on which the isopleth curves are determined is an interpolation between concentrations 250m apart, rather than be determined by the actual concentration values themselves, had a finer receptor resolution been used.

More importantly, peak ground level concentrations can easily be missed and never computed as the centreline of the plume passes between the coarsely spaced receptor points.

4.2.2 Source Characterisation

It is normal practice for Air Quality assessment reports to provide detailed tables of the emitting sources parameters used to characterise the source. For example for an area source it is normal to provide tables detailing each source with the following information; Model ID number, description of the source, the southwest (or centre) coordinates, the size of the aera source to be modelled, the emission rate per square metre and the initial dilution in the vertical. The AQIA does not provide any information on the size of the sources modelled, their source locations or coordinates, model input parameters, or aspect ratios of the sources. Therefore, it is impossible to conduct a review or determine if the modelling has been done reasonably without this information. Small modifications to any of these important parameters can make significant downwind changes in concentration. This is a serious shortcoming of the AQIA.

4.2.3 Other

Appendix A of the AQIA states that building downwash was conducted using the ISC downwash algorithm. This is incorrect and the PRIME downwash algorithm should have been used.

No model files have been provided, therefore the source characteristics, emission rates, model switches etc cannot be verified against the report.

In addition, insufficient information pertaining to the technical assumptions, inconsistencies and errors in the report, general lack of detail or discussion means the AQIA cannot be relied on to provide a robust and meaningful impact of the air pollution effects on neighbouring Jacfin owned land.

4.3 Particulate Matter

In general, the PM emissions appear reasonable. Monitoring of PM is in place both at the facility and at nearby OEH sites. PM is relatively easy to monitor, and is more straight forward to manage than odour. The facility currently has dust controls in place and also has a clear mitigation strategy in the event the emissions become too large. Water damping, enclosed sheds and sealed roads will greatly reduce PM from the facility.

However, there are several other major issues with the PM modelling, which are detailed below.

4.3.1 Pit Effects

The modelling contained in the AQIA does not account for 'pit effects' which include changes to the local meteorology and how the shape, depth and orientation of the fit might have on the dispersion of PM, asbestos fibres, and odour.

The open cut elliptical void of the Project site pit is approximately 430m x 700m and up to 150m deep. The surface area is approximately 288,000 m^2 at ground surface and 12,000 m^2 at the base. The total landfill catchment area is approximately 472,000 m^2 as provided in the Leachate Generation Model documentation[6] of August 2017.

Because the air flow within the Genesis pit differs to the flow outside the pit due to topographic, thermal and meteorological factors, this can have a significant effect on upwind receptors and the load of PM they receive. Recognising the different conditions within a pit (as an emitting source) and outside the pit, the United States Environment Protection Authority (US EPA) included an Open Pit model in its Industrial Source Complex Model (ISCST3). The use of the Open Pit model permits realistic modelling of pollutant dispersion and disruption both internally and externally of the pit.

Open pits are characterised by differential air flow entering the pit, inside the pit and exiting the pit. While PM emissions and settling may be great within the pit, they can also be significant outside the pit in certain locations depending on the wind regime and orientation of the pit to the dominant flow. The pit is subject to topographic factors. The pit facilitates the easy penetration of the wind because the shape of the pit guides the wind flow and affects the ambient wind speed. The pit channels and confines the plume dispersion and can cause flow re-circulations within the pit[7].

Based on observations and measurements in wind tunnel studies (Petersen and Perry 1996),[8] increased pit emissions show a tendency to be emitted from an upwind sub-area of the pit opening. The shape, size, depth and orientation of the pit are important as the wind direction will vary according to the pit orientation. In the case of the Project site, the orientation of the pit is southwest to northeast, and the dominant wind flows are the southwest and north, so potential main exit routes for particulate matter within the pit will be directly toward the northeast and south and are likely to impinge directly on nearby AQIA sensitive receptors, CL12 – CL18 when the wind is from the southwest which is ~42% of the time and on Jacfin land to the south for approximately 24.6% of the time in any single year.

The effect of overburden in the pit is of concern. Typically, overburden occurs when activities within the pit create a pile of material for temporary storage. Overburden within the pit can be easily be dispersed especially if the overburden is on the upwind long-oriented side of the pit (for Facility's pit this would be in the southwest and northeast corners). Overburden in the pit is of concern to nearby

[6] Table 1. Modification 6 – Leachate Generation Model, prepared by Consulting Earth Scientists. 14 August 2017.

[7] Appleton, T., Kingman, S., Lowndes, I., and Silvester, S. (2006). The development of a strategy for the simulation of fugitive dust emissions from in-pit quarrying activities: a UK case study, *International Journal of Mining, Reclamation and Environment,* Vol., 20 (1), pp. 57–82.

[8] Petersen W.B., Perry S.G. (1996) Improved Algorithms for Estimating the Effects of Pollution Impacts from Area and Open Pit Sources. In: Gryning SE., Schiermeier F.A. (eds) Air Pollution Modeling and Its Application XI. NATO · Challenges of Modern Society, vol 21. Springer, Boston, MA

sensitive receptors who could be receiving significant amounts of additional PM that has not been included in the model.

In summary, the pit will have a significant impact on the dispersion of PM, asbestos fibres and odour especially at nearby sensitive receptors. The key impact will be that the pit which is a significant emissions source will steer pollutants towards one or two key exit points (toward the northeast and south) depending on the prevailing wind direction and speed at the time. Without considering 'pit effects' and modelling the pit as a flat source, the AQIA has underestimated the air pollution effects at key locations.

Until the pit effects are properly understood, the air quality impacts of the Proposal have not been adequately assessed.

4.3.2 Cumulative PM effects

It is normal when conducting Air Quality Assessments to take into consideration the following;

1) The cumulative effect of all the Project Site sources and air pollutants
2) The cumulative effect of all the nearby additional contributing sources and their air pollutants
3) The background pollution which represents the lowest levels of ambient air pollution to which the population is chronically exposed.

The Project site then assumes the following: 1 (Project site) + 2 (nearby sources) + 3 (background) to get a total air pollution concentration which is then compared against the relevant air quality assessment criteria.

The AQIA has only considered (1) summed to (3), and has not considered the cumulative effects of any nearby neighbours. In particular the AQIA has not taken into account the air pollution contribution from the potential next door neighbour, 'The Next Generation', Energy from Waste facility whose application is currently through the courts. The proposed EfW facility is a significant emitter of particulate matter. Had, the AQIA considered the cumulative effects correctly then PM_{10} and $PM_{2.5}$ would be well in excess of the NEPM 2021 and proposed 2025 criteria.

4.3.3 PM_{10} and $PM_{2.5}$ Ground level concentration isopleth plots

It is understood from the EIS that the key operational components of the Proposal is as follows;
Stage 1 – an initial throughput of 500,000 tpa of which the majority will be received and processed within the MPC2.
Stage 2 – facilitation of the remaining 450,000 tpa (total of an additional 950,000 tpa) will be received and processed with the MPC2.

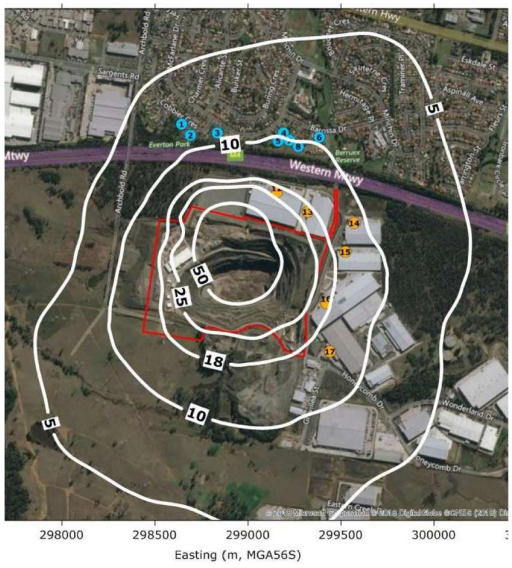
Figure 4-1 presents the concentration isopleth plots for the predicted PM_{10} (top) and $PM_{2.5}$ (bottom) from the Ramboll (2018) report for 2 Mtpa of material on the left hand side and 2.95 Mtpa of material from the AQIA (2022) on the right hand side. The 10 $\mu g/m^3$ isopleth contour plot in the AQIA for the 24-hour PM_{10} extends northward compared to the same Ramboll, 2018 contour plot. This is expected as concentrations are expected to be greater and extend further for an additional handling of 950,000 tpa of material.

However, the concentration isopleth plots for $PM_{2.5}$ show a different pattern where the AQIA is predicting lower $PM_{2.5}$ concentrations for an additional 950,000 tpa of material compared to that predicted by Ramboll, 2018. A comparison of "commercial receptors" between the two reports (as shown in Table 4-1 below) shows that the AQIA is predicting lower concentrations of $PM_{2.5}$ for an additional 950,000tpa of material. This is not possible. If PM_{10} predictions for the Proposal are higher so will $PM_{2.5}$.

Table 4-1. Comparison of $PM_{2.5}$ at AQIA 'commercial receptors' from Ramboll, 2018 results (left column) and the AQIA (right column).

Ramboll, 2018, Table 7.2, (24-hr, $PM_{2.5}$ µg/m^3) Throughput of 2 Mtpa		AQIA, 2022, Table 6.3, (24-hr, $PM_{2.5}$ µg/m^3) Throughput of 2.95 Mtpa	
Receptor # 12	4.8	Receptor # 12	3.1
Receptor # 13	4.1	Receptor # 13	2.8
Receptor # 14	2.7	Receptor # 14	2.6
Receptor # 15	3.3	Receptor # 15	3.2
Receptor # 16	4.2	Receptor # 16	3.8
Receptor # 17	3.8	Receptor # 17	5.7

Figure 4-1. 24-hour average concentration isopleth plots for PM_{10} (top) and $PM_{2.5}$ (bottom) are shown for Ramboll (2018) (lhs) for Mod 6 approval of a 2 Mtpa throughput and the AQIA (2022) (rhs) for Mod 10 approval for a throughput of 2.95 Mtpa.

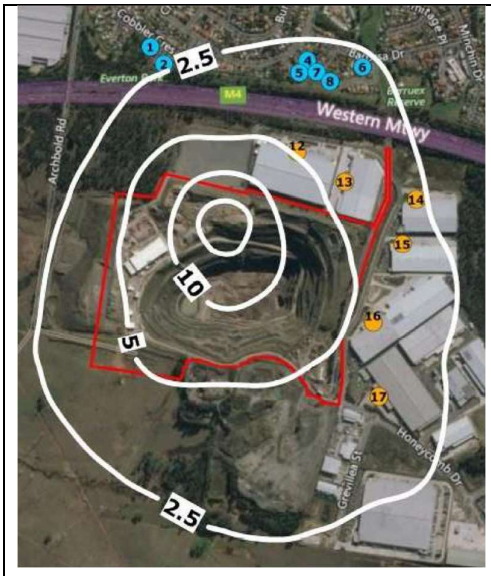
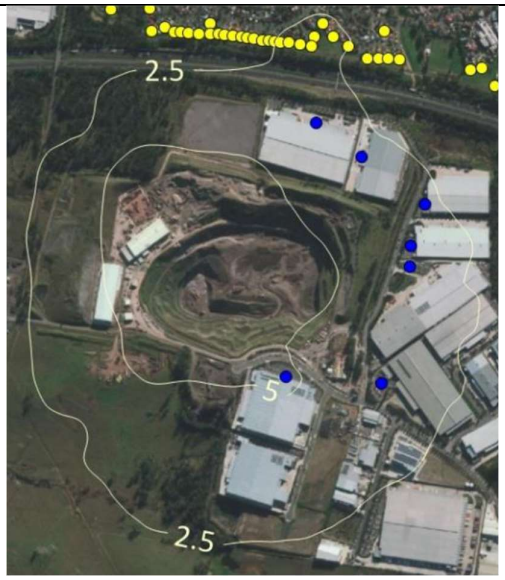


Ramboll, 2018 (PM10, 24-hour average)

Throughput of 2 Mtpa with 1 Mtpa to landfill

AQIA, 2022 (PM10, 24-hour average)

Throughput of 2.95 Mtpa with 1 Mtpa limit to landfill

	
Ramboll, 2018 (PM25, 24-hour average) Throughput of 2 Mtpa with 1 Mtpa to landfill	AQIA, 2022 (PM25, 24-hour average) Throughput of 2.95 Mtpa with 1 Mtpa to landfill

4.3.4 Quantity of waste to landfill for Stage 2 operations

With the additional 950,000 tpa of throughput to the Bingo facility as proposed for Stage 2 operations, it is not stated anywhere in the EIS how much of this additional waste will be sent to landfill. While the Project is not requesting additional throughput to landfill other than the approved 1 Mtpa, it can be assumed that they have not yet reached the landfill limit.

However, Table 3.1 of the AQIA which shows the throughput assumption for each scenario, provides some insight into the amount of Stage 2 throughput that might go to landfill. Table 4-2 below has been expanded from Table 3.1 in the AQIA, to show the actual (calculated) quantities of waste destined for each facility at the Project site. The table shows that the bulk of Stage 2 throughput (65%) will go to MPC2, and that the increase to landfill from current operations will be 65,250 tpa. It is not known how much of this additional waste to landfill will be Asbestos containing material, or of odour potential. Tables B.1 and B.4 of the AQIA which show the emissions of each scenario, show no difference in PM emissions to landfill between current approved operations and Stage 2 operations despite the additional tonnage. The pit and its activities are a significant source of air pollution exacerbated by the pit itself. By ignoring the additional ~65,250 tpa tonnage to landfill in both the odour model and PM model is to significantly underestimate the concentrations at nearby sensitive receptors.

Table 4-2. Expanded throughput of each operation at the Project site for current approved operations (left) and Stage 2 operations (rhs) based on AQIA Table 3.1.

Destination	Approved (tpa)	Stage 2 (tpa)
Total waste in	2,000,000	2,950,000
Landfill limit	1,000,000	1,000,000
Resource Recovery (RR) limit	1,000,000	2,950,000

Waste direct to landfill	1,000,000	1,000,000
Waste to MPC1	40% of RR =400,000	20% of RR = 390,000
MPC1 waste to landfill	15% of RR = 60,000	15% of RR = 58,500
Waste to MPC2	40% of RR = 400,000	65% of RR = 1,267,500
MPC2 waste to landfill	15% of RR = 60,000	10% of RR = 126,750
Waste to SMA	20% of RR = 200,000	15% of RR = 292,500
Total waste to landfill	**120,000**	**185,250**

4.3.5 Daily fluctuations in throughput and additional stockpiling

The PM modelling (prior to the 2022 AQIA) only considered the annual limits of material allowed and has not accounted for variations in the daily disposal rate which will vary in response to market demand and could be more than double that modelled on a day to day basis. This point was originally raised in a letter from the EPA (Revised RtS Appendix M, October 2019) at the time when the facility had a proposed limit of 2,740 tpd, but were likely to have days when waste was up to 5,400 tpd). The AQIA has tried to address this by considering a 'theoretical peak day' by scaling the concentrations by 1.3, which corresponds to the 95th percentile traffic rates. The resulting concentrations at two key sensitive receptors was shown graphically (Figure 8-1) as cumulative days above the NSW EPA 24-hour PM criterion.

ASG has the following concerns with the AQIA determination for the theoretical Peak Day.

- The theoretical peak should take into consideration all days whose throughput is currently higher than the mean based on historical daily tonnage throughput in conjunction with the additional cumulative PM effects of nearby neighbours plus background. The logic behind a scaling factor of 1.3 based on traffic rates at the 95% percentile used in the AQIA does not make any sense, and only takes into consideration those days when tonnage is 30% higher than normal and does not account for those days when tonnage received is double or more. The approach used in the AQIA will significantly underestimate all those days when the waste is greater than the mean modelled.

- For Modification 6 approval the EPA pointed out that the maximum throughput could be as high as 5.5 tpd. The maximum throughput on any one day with an additional 950,000 tpa of material will be significantly higher than 5.5 tpd.

- The AQIA method using a 1.3 scaling factor produced 27 days >50 µg/m^3 at commercial receptor #18 for current approved operations and 17 days > 50 µg/m^3 at the same receptor with an additional 950,000 tpa. There are three concerns;
  a) It is not possible that Stage 2 operations (with an additional 950,000 tpa of throughput) has fewer days over 50 µg/m^3 than current approved operations.
  b) Even with a simple scaling of 1.3 to the concentrations, 17 days in excess of the assessment criteria is significant. Especially considering that:
     - The scale factor of 1.3 does not reflect the maximum tonnage likely to expect on any one day.
     - Cumulative effects of nearby neighbours are not included in the calculation.

- Pit effects which will channel and steer the plume have not been taken into consideration. If all these considerations were taken into account the number of potential days > 50 $\mu g/m^3$ would be significantly higher.

- In Figure 8-2. The AQIA tried to assess the number of days in a year where a theoretical peak might occur. The number of peak theoretical days decreased to 0.8 for the Proposal (Stage 2) and yet, was 1.3 days for the current approved operations. The AQIA made the following statement:

  "The improvements at the Proposal site for Stage 2 operations leads to a significant reduction in the likelihood of additional exceedance days when compared with Approved operations, indicating that the Proposal will have a positive influence on air quality impacts from te Proposal site at surrounding receptors".

  However, Stage 2 of the proposal does not show a significant reduction in emissions from the current approved operations as this statement from the AQIA suggests. Stage 2 operations as explained in the EIS and AQIA would be operations at 2,950,000 tpa of throughput and operation of two new exit connections on Honeycomb drive and Kangaroo Avenue as well as operation of two outbound weighbridges at each exit. In addition some internal roads will have been upgraded with additional car parking. In other words for Stage 2 operations, there is no positive change to the current approved emitting sources (Landfill, SMA, Waste truck numbers in and out, MPC1 and MPC2) plus there is an additional 950,000 tpa of waste. Therefore, the statement made in the AQIA does not make any sense that the improvements for Stage 2 will lead to a significant reduction when compared to approved operations.

  Examination of the total PM_{10} and $PM_{2.5}$ emissions for current approved operations and Stage 2 operations as per Table 3.2 of the AQIA are shown in Table 4-3 below. Note that the TSP, PM_{10} and $PM_{2.5}$ emissions are significantly higher in Stage 2 operations than in the current approved operations. This is not unexpected with the additional throughput of 950,000 tpa of waste.

Table 4-3. Annual emissions for each scenario (Table 3.2 AQIA).

Emission Source	TSP (kg/annum)	PM_{10} (kg/annum)	$PM_{2.5}$ (kg/annum)
Current Approved Operations	48,776	13,278	1,915
Stage 2 Operations (The Proposal)	65,293	20,437	5,675

According to Table 4-2 (Table 3.2 in AQIA) the $PM_{2.5}$ emission rate in Stage 2 operations is 66% higher than current approved operations and yet the $PM_{2.5}$ model results are lower than the current approved operations at all sensitive receptors, and the 24-hour ground level concentration 'footprint' is retracted compared to the current approved operations. (The PM_{10} Stage 2 operations emission rate is 36% higher than the current approved operations).

The AQIA concludes that Stage 2 operations produced a lower peak 24-hour average results due to the reconfiguration/optimisation of the Eastern Creek REP, which acts to re-distribute dust emissions, especially by trucks, by re-directing truck exit points to Honeycomb Drive and Kangaroo Avenue at the northeast of the Project site.

ASG disagrees with this conclusion. The very coarse model grid resolution used in this assessment means that any changes in the source locations will make no difference to the model outcome. The $PM_{2.5}$ model results do not reflect the significantly higher (66%) Stage 2 emission rates than the approved operations. In comparison, the PM_{10} Stage 2 model results at 36% higher than current operations look reasonable. Therefore, the model results for $PM_{2.5}$ are invalid.

- In addition, to the above points (referring to fluctuations in daily tonnage), the AQIA has failed to take into account the significant practical operations involving storage, stockpiling, transferring and handling of higher than normal waste loads on a day to day basis. Storage times could be longer, and additional stockpiling may be required. There is an increased air pollution risk associated with higher than normal loads that has not been taken into account in the AQIA.

4.4 Asbestos

4.4.1 Quantity of waste to landfill for Stage 2 operations

Section 4.3.4 'Quantity of waste to landfill for Stage 2 operations' above has shown that the amount of waste to landfill for the proposed Stage 2 operations will be in the region of 65,250 tpa more than currently approved. However, it is not stated anywhere in the AQIA or EIS how much of this waste will be asbestos containing material (ACM) which must be landfilled. The EIS describes asbestos waste as that coming from; wrapped asbestos sheeting, asbestos soil and C&D waste containing asbestos.

In the Ramboll, 2018 AQIA in support of an increase in throughput to landfill from 700,000 tpa to 1,000,000 tpa, acknowledged that ACM would increase significantly. In 2017-2018, soil containing asbestos, and asbestos in construction material already accounted for 60% of the landfill waste. In addition, the ACM waste stream is expected to continue growing at Eastern Creek as the NSW construction and redevelopment boom continues and the number of alternative disposal sites reduces.

Information on ACM is important given the known health implications of airborne asbestos fibres[9] in the atmosphere, and the already high risk to exposure of asbestos fibres caused by the recent 4 February, 2020 fire at Eastern Creek. It is not acceptable that neither the AQIA, nor the Human

[9] Airborne asbestos fibres are long and large compared to PM. Unlike PM airborne asbestos fibres are not subject to gravitational deposition and can remain aloft for extended periods of time. Any airborne asbestos fibres will be subject to the same wind and thermal effects caused by the pit effects as odour and PM, but with the exception that deposition of asbestos fibres will be a lot less efficient than PM. This may mean that once asbestos fibres are airborne they will remain airborne for long periods of time and therefore will be in a position to easily escape the pit when the thermal conditions or wind speeds are conducive. It is not straightforward to model airborne asbestos due to the nature of the fibres, unique atmospheric behaviour, and unique deposition velocities compared to spherical particles which forms the basis of all deposition algorithms in dispersion models.

Health Report[10] make any mention of the risk of asbestos exposure under either current operating levels or under the Proposal.

In the Revised Response to Submissions for the Modification 6 approval, there were 16 submissions from the community as listed in Table 6.2 relating to asbestos concerns. The response from the Proponent was wholly inadequate stating that " *asbestos waste is regulated by the NSW EPA, and that the issue of illegal dumping of asbestos waste should be more of a concern for regulators and the community".*

Exposure to asbestos fibre is a serious health concern and the risks of the additional throughput of ACM needs to be raised and discussed in the AQIA and in the human health risk assessment, especially in light of the recent fire, where residents from Minchinbury and Rooty hill complained about 'toxic, plastic, chemical smells '. The AQIA and Human Health risk assessment need to provide a comprehensive management plan and risk assessment to allow affected parties to consider the risks of airborne asbestos.

4.5 Odours

4.5.1 Overview

The AQIA stated that a future cumulative odour emission scenario for the Eastern Creek REP was prepared following the collection of measurements from the site in June 2022 which were to account for the existing odour sources as well as the emissions from the approved Modification 10 (permanent landfill gas flare) plus proposed Modification 9 which was relocation of the timber yard and green waste storage area. The AQIA states that the odour emission inventory is highly conservative. It is understood that samples were collected from the leachate dam, landfill surface (active tipping face, daily covered material and intermediate waste cover), LFG extraction system pipe and the existing green waste stockpiles.

The AQIA considers the odour emission inventory conservative for the following reasons:

1) The collection of odour samples was completed before the installation of the flares.
2) The entire landfill floor area, except for the active tipping face, daily cover and leachate riser, was assumed to have an odour emission rate equivalent to intermediate (4 week old) cover material. (The AQIA makes the point that in some places the landfill cap would have been in place for much longer periods).
3) Green waste will be stored in a shed fitted with roller doors. The odour emission assumed a 90% reduction factor of odours (instead of say 99%). A green waste stockpile of 3,200 m^2 was present at all times within the enclosure.

4.5.2 The odour model is not conservative

The AQIA states that the odour emission scenario is conservative because they have measured current odour sources, taken into consideration the relocation of the timber yard and green waste and

[10] Appendix L. Human Health Risk Assessment. June 2022. Eastern Creek Recycling Ecology Park. Recycling Infrastructure Optimization Project. Prepared for Bingo Industries by EnRiskS

considered the effect of the bio gas flares. However, the emissions do not take into account the potential odour from Stage 2 additional 950,000 tpa of waste where approximately 65,250 tpa will go to landfill in Stage 2 operations. This is not a conservative odour emissions model.

In addition, the odour model has not taken into consideration any aged material that may be stockpiled on site for a period of time as a consequence of the extra 950,000 tpa of material, or, because of high daily load variations.

Without full technical details of Modification 9, it is premature assume that the 90% reduction factor on the potential odour emissions is applicable. In fact without any specifications of Modification 9, the potential odour emission from the green waste pile is not conservative. In addition, it is not conservative to assume a constant green waste stock pile of 3,200m^2 at all times. The facility has a licence to hold up to 20,000m^2 of green waste at any one time, therefore to maintain a stock pile one sixth of what is allowed is not an unreasonable assumption.

4.5.3 Other Odour Concerns

The odour emission rate detailed in the AQIA, Table 6-2 provide the size of the area sources used in the modelling and the emission rate in units of grams per metre per second. However, how the sources were characterised with regards to aspect ratio (width to length ratio of each source), and the size of each modelled area source has not been provided. Incorrect aspect ratios of area sources and large area sources will significantly underestimate the downwind predicted concentrations in the near field.

It is unclear whether the NSW Approved Method Peak to Mean factor of 2.3 ou has been applied for all receptors and all stability classes for all sources modelled. The Peak to Mean Factors are not mentioned anywhere in the AQIA, which suggests that the all the odour concentrations should be scaled up by a factor of 2.3.

The Proposal has neglected to consider the 'pit effects' on odour dispersion. Further the Proposal has not considered the potential for odour accumulation at night time.

The odour assessment has not considered 'worst case upset emissions. This is significant given the extensive odour complaints from the Project site during 2021, which was caused by persistent rainfall events due to La Nina conditions. Bingo has since installed and is operating two permanent LFG flares to assist in odour gas burn off. Since the flares were installed the odour complaints have dropped significantly. However, La Nina conditions still persist during 2022 and future high rainfall events, failure of the flare systems and decomposing greenwaste should be considered as upset conditions.

There is no odour mitigation management plan in the AQIA. Given Bingo's history of offensive odour emissions and the lack of any meaningful buffer or separation distance between itself and sensitive receivers, this should be a high priority. The AQIA needs to provide surety and confidence to the community that it can manage offensive emissions.

A full review of the odour assessment is not possible without the model control files. The lack of detailed information within the AQIA, and the inability to review the model control files means that the odour model results cannot be verified or the potential impacts assessed.

5. Conclusions

The AQIA used the same meteorological model as Ramboll in 2018 when the site was seeking to increase the hours of operation and increase the annual landfill cap limit of 700,000 tpa to 1,000,000 tpa. No improvements to the meteorological model were made. The AQIA conducted no additional model evaluation and referred to the Ramboll 2018 report for model evaluation and summary. In analysis of the Ramboll, 2018 model (which still applies to this Proposal), it was concluded that:

'***In summary, the meteorological model is of a poor standard, and the evaluation is also poor. The meteorological model could be significantly improved from what has been provided in the AQIA. The meteorological data is the most important input into the model and will have a direct result on the model predictions'***

In addition, the dispersion model cannot be relied upon to provide a robust and meaningful impact on the air pollution impacts of the Proposal on nearby owned Jacfin land. There are multiple errors and inconsistencies in the AQIA and there is insufficient vital technical information to conduct a complete review. All of the concerns raised in this review suggest that the AQIA has significantly under predicted the ground level concentrations of key pollutants, PM, and odour, and in particular $PM_{2.5}$. Accordingly, the air quality impacts of the proposed development on the surrounding area are unable to be assessed.

PROJECT

REVIEW OF ENVIRONMENTAL IMPACT STATEMENT (EIS) WITH RESPECT TO LEACHATE MANAGEMENT AND ODOUR – PROPOSED EXPANSION OF RECYCLING AND LANDFILL FACILITY, EASTERN CREEK NEW SOUTH WALES

PREPARED FOR
JACFIN PTY LTD

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SYNOPSIS This report reviews an Environmental Impact Statement (EIS) describing a proposal to increase throughput (from two million tonnes per annum (Mtpa) to 2.95 Mtpa at Bingo Industries' 'Eastern Creek Recycling and Ecology Park' and landfill facility. Focussing on the leachate and odour aspects of the EIS, this report considers the history of odour generation and other environmental impacts due to site activities, the details of the current and proposed leachate management regime, and the likelihood of ongoing impacts extending beyond the bounds of the facility.

REVISION HISTORY

REVISION #	DATE	EDITION BY	APPROVED BY
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SUMMARY

Jacfin Pty Ltd commissioned Gilbert & Sutherland (G&S) to undertake a Review of the Environmental Impact Statement (EIS) with respect to leachate management and odour for the proposed expansion of the recycling and landfill facility at Bingo Industries' Eastern Creek Facility ('the Facility' or 'the site') in Sydney's western suburbs, New South Wales.

Our review of the 2022 EIS confirmed that the proponent continues to operate the facility on the basis of retaining large volumes of leachate within the waste mass beyond the predictions of its site water balance modelling.

The EIS afforded the Proponent the opportunity to review and address the disparity between the leachate generation predictions of the 2008 ERM report and the actual conditions measured onsite. In the context of the proposed increased waste throughput and odour generation issues experienced at the site this review should have occurred.

The level of leachate within the waste mass continues to increase and the Proponent proposes nothing to address the discrepancy between the predicted leachate generation volumes, the actual leachate generation volumes and the apparent odour generation issues at the site. The EIS states that no changes are proposed to the landfill operations or leachate management as a part of the Proposal.

Excessive leachate levels within the landfill will continue to generate landfill gasses and therefore odour issues. The proponent's approach is to flare the gasses to treat the impacts, rather than to propose effective design changes to minimise leachate generation rates and increase leachate treatment and discharge capacities. To that end, the proposal remains constrained by leachate treatment and discharge facilities that are operating at or close to capacity.

In our view, this leachate management regime remains fundamentally at odds with the current EPA Guidelines for Landfilling in NSW.

In summary:

- The facility generates more leachate than was predicted by the underpinning modelling.
- Leachate volumes being stored within the landfill in 2019 and 2020 were in excess of the modelled predictions indicating accumulation of leachate up to -19mAHD in 2019 and 12m AHD in 2020 (some 46m in 2019 increasing 78m in 2020).
- Rainfall recorded in 2021 and to date in 2022 were also elevated, indicating that the levels of leachate in the pit are likely to have increased further.
- The EPA has identified the leachate collection system (including the leachate riser and vent pipe) as an odour pathway. The Proponent has constructed and implemented a flare system to manage these gases.
- Gas production (and therefore odour) increases with increased moisture content. In simple terms, the more moisture within the waste mass the greater the odour generation.
- The form of the gas generated is determined by the type of waste present, for example, construction and demolition landfills produce large amounts of hydrogen sulfide (rotten egg gas), often due to the presence of plaster board (gypsum board).
- The leachate treatment and discharge facilities are likely to be operating at or close to capacity, limiting the Facility's ability to reduce the accumulated leachate levels within the landfill.
- The current leachate management practices (particularly the storage of large quantities of leachate within the waste mass) do not align with the current EPA Guidelines for Landfilling in NSW.

Given that the depth and volume of leachate stored within the landfill is already unacceptably high, and that no changes are proposed to the leachate management regime under the increased throughput scenario, the intensification of site activities represents a risk to local and regional groundwater that is not assessed in the 2022 EIS.

CONTENTS

1 Introduction

Jacfin Pty Ltd ('Jacfin') commissioned Gilbert & Sutherland (G&S) to undertake a Review of an Environmental Impact Statement (EIS) for the proposed intensification of activities at Bingo Industries' ('the Proponent' or 'Bingo') recycling and landfill facility at Eastern Creek in Sydney's western suburbs, New South Wales ('the Facility' or 'the site').

1.1 Previous report

In 2021, G&S reviewed information pertaining to odour issues associated with the site's proposed increase in annual throughout. Our subsequent letter report, dated 2 July 2021, identified that a likely cause of odour generation was the large volume of leachate accumulated within the waste mass, together with the site's leachate management practices and associated matters.

G&S prepared a report dated 2 July 2021 that considered reports and information current at that time. It noted that Bingo was preparing an EIS to address the Planning Secretary's environmental assessment requirements (SEARs) for a State Significant Development (SSD) Major Project application to increase the Facility's throughput from two million tonnes per annum (2 Mtpa) to 3.5 Mtpa.

1.2 Bingo Industries' 2022 EIS

Bingo has subsequently prepared and submitted to the NSW Department of Planning an EIS entitled 'Environmental Impact Statement, Eastern Creek Recycling Infrastructure Optimisation Project (SSD-11606719)' dated June 2022 ('herein the '2022 EIS'). The 2022 EIS now proposes a staged increase to the Facility's throughput – from 2 Mtpa to 2.95 Mtpa.

1.3 Current report

G&S completed a preliminary review of the 2022 EIS with respect to leachate management practices and the potential for the proposed increase in throughout to result in off-site impacts. This report expands upon our preliminary review and provides additional analysis of the latest monitoring data, annual reviews, and the 2022 EIS to better define the shortcomings and failures of the current and proposed operations in terms of leachate generation, odour production and the management of these issues.

Given the site's history of excessive leachate generation and odour problems, this report considers the EIS' response to these impacts on nearby receptors including Jacfin's lands to the south of the Bingo Facility, and the wider receiving environment.

2 Site description, proposal and scope of review

2.1 Location

Located at 1 Kangaroo Avenue, Eastern Creek in the central western suburbs of Sydney, the predominant feature of the site is a breccia quarry (previously known as the 'Pioneer Quarry') which was subject to extractive operations from the 1950s until September 2006. The site location is shown on Drawing 12138_001 in Appendix 1.

2.2 Site description

The Facility's current operational site area is approximately 46 hectares (ha), of which the landfill/former quarry pit occupies some 75% (or 40 ha). The pit is an open cut, elliptical void measuring approximately 430 x 700 metres and up to 150 m in depth, with stepped walls and an estimated volume of 11 million cubic metres (m^3)[1].

The surface materials at the site comprise clay and weathered shales to depths approximating 32 metres below ground level (m bgl). Intact Bringelly shales predominate below the weathered shales down to depths approximating 146 m bgl. The Hawkesbury Sandstone is likely to be located some 20 m below the base of the landfill pit.

2.3 Groundwater environment

An intermittent shallow perched groundwater system exists around the site within the weathered profile. According to Environmental Resources Management (ERM) Australia, permeabilities of these deposits range from $1.46E^{-3}$ m/day to 0.25 m/day. Based on the isolated seepages observed from the clay and weathered shales exposed on the pit walls, ERM reported that hydraulic contact between this system and the quarry is insignificant.[2]

The landfill is located mostly within the Bringelly Shale strata, which exhibits a regional groundwater table at an elevation of approximately 24 m Australian Height Datum (AHD), or some 82 m above the pit base. This indicates a substantial hydraulic gradient towards the pit and suggests that the bulk formation hydraulic properties (including fracturing) of the surrounding geology are low. The permeability of the Bringelly shale has been calculated to be very low (at $1.75E^{-6}$ m/day to $8.7E^{-6}$ m/day).

2.4 Leachate generation and odour

In 2021 the Bingo site was the source of large-scale odour issues throughout the neighbouring locale. A substantial number of odour-related complaints were made directly to the Bingo facility[3] and/or directly to the New South Wales Environmental Protection Authority (EPA).[4] As a result of those odour complaints, the EPA issued a Clean-Up Notice (#3500173) that, inter alia, directed the Proponent to undertake remedial actions relating to the leachate riser and leachate vent pipe.

The EPA's Clean-Up Notice identified the leachate collection system (including the leachate riser and vent pipe) as an odour pathway and required remedial works be undertaken with respect to that infrastructure. Whilst the EPA's identification of remedial works dealt with the pathway for the movement of odour, they did not deal with the generation of the odour itself.

Gas production (and therefore odour) increases with increased moisture content. In simple terms, the more moisture within the waste mass the greater the odour generation. The form of the gas generated is determined by the type of waste present. For example, construction and demolition landfills produce large amounts of hydrogen sulfide (rotten egg gas), often due to the presence of plaster board (gypsum board).

[1] Consulting Earth Scientists (August 2017). MOD6 – Leachate Generation Model. Genesis Landfill and Recycling Facility Prepared for Dial-A-Dump Industries Pty Ltd.

[2] Environmental Resources Management (ERM) Australia (August 2008). Light Horse Business Centre, Eastern Creek, NSW, Australia, Groundwater Assessment.

[3] 24 direct complaints since 1 December 2020, with 23 of those relating to odour.

[4] Between 1 April and 6 May 2021, the New South Wales Environmental Protection Authority (EPA) received more than 350 reports of offensive odours related to the site.

2.5 Scope of review

This report expands upon our previous reviews (in July 2021 and July 2022) by providing additional analysis of the latest monitoring data, annual reviews, and the 2022 EIS. To that end this report focussed upon the following information sources:

- Bingo Industries (June 2022), Environmental Impact Assessment, Eastern Creek Recycling Ecology Park ('2022 EIS).
- Bingo Industries (July 2021). Air Quality, Odour and Greenhouse Gas Management Plan (AQMP), Eastern Creek Recycling Ecology Park (& Landfill).
- Bingo Industries (February 2021). Soil, Water and Leachate Management Plan (SWLMP), Eastern Creek Recycling Ecology Park (& Landfill).
- Bingo Industries (2022). 2020 Annual Environmental Review - Eastern Creek Recycling Ecology Park ('2020 AER').
- AT&L (June 2022). Eastern Creek Recycling Ecology Park: Appendix N - Community & Surface Water Impact Assessment ('Appendix N 2022 EIS').
- Elton/WSP (18 February 2022). Eastern Creek Recycling Ecology Park: Appendix H - Community & Stakeholder Engagement Strategy and Outcomes Report for the Recycling Infrastructure Optimisation Project ('Appendix H 2022 EIS').
- Environmental Resources Management (ERM) Australia (August 2008). Leachate Collection System Concept Design.
- Crespi Projects (June 2011) Leachate Collection Conveyance and Management System.

3 Leachate generation and management proposal

Whilst the 2022 EIS identifies minor changes to the proposal and supporting information since the G&S review of July 2021, it is concerning to note that the proponent's fundamental approach to the management of leachate at the site is essentially unchanged. The 2022 EIS states (at page 245):

> *No changes are proposed to the landfill operations or leachate management as a part of the Proposal. Leachate management is therefore not considered further within this assessment.*

From this we understand that the Facility's leachate management will continue in line with the 2021 Soil, Water and Leachate Management Plan, which is underpinned by the 2008 ERM Leachate Collection System Concept Design and later by Crespi Projects in their 2011 Leachate Collection Conveyance and Management System and described by ERM in the 2008 EIS.

Review of the above documentation indicates that leachate is generated in several parts of the site including the green waste storage and processing area, the Materials Processing Centre (MPC) work floor area and from the active landfill face.

Leachate generated in the green waste storage and processing area flows to a sump and is then recirculated to the green waste stockpiles, reportedly to encourage organic degradation and minimise dust generation. Excess leachate that cannot be recirculated is pumped to the sump at the base of the landfill (estimated to be a maximum of 10 m^3 per day[5]). This leachate is, in turn, pumped to the leachate treatment system.

Leachate generated within the MPC is pumped to the sump at the base of the landfill, from where it is then pumped to the leachate treatment system. The volume of leachate generated within the MPC is estimated at 0.5 m^3 per day.[6]

3.1 Leachate generation

The ERM 2008 Leachate Collection System Concept Design for the landfill estimated that leachate generation within the landfill itself would range from 45 to 872 m^3/day, with an average of 241 m^3/day.

ERM 2008 predicted that in order to maintain groundwater at acceptable levels within the landfill, the required pumping rates would range from 250 to 500 m^3/day. It also stated that, providing the pumping rates did not fall below 241 m^3/day, the landfill could be used as a leachate storage facility during times of high rainfall and that based on these rates, leachate levels in the landfill could be limited to 3 m above the pit base (see ERM report's '*Changes in Landfill Leachate Water Elevations with Changes in Leachate Dewatering Rates*' graph, reproduced for reference herein at Appendix 2).

Table 3.1.1 summarises the surface water and leachate generation volumes as described in the ERM 2008 Leachate Collection System Concept Design for the landfill.

Table 3.1.1 Surface water and leachate generation estimates (spreadsheet water balance model, ERM 2008)

Metric*	Surface Water inflow (m^3/day)	Leachate generation (m^3/day)	Total inflow (m^3/day)
Minimum	209	45	254
10th percentile	238	119	357
Average	385	241	626
90th percentile	507	374	881
Maximum	1003	872	1875

The MOD6 Approval for the site included an updated water balance and assessment of leachate generation to reflect the increase in landfilling capacity. To that end it provided Average Annual Leachate Generation figures under various scenarios. Under the MOD6

[5] Crespi Projects (June 2011).

[6] Crespi Projects (June 2011).

Approval, the average expected initial leachate generation rate was 192 m^3/day or approximately 70,000 m^3 per annum. This was projected to increase to 505 m^3/day or approximately 185,000 m^3 per annum at the completion of landfilling.

3.2 Leachate treatment

Whilst the Proponent seeks approval for an annual throughput increase of almost 50% operational capacity, current landfill operations and leachate management remains unchanged in the 2022 EIS.[7]

Similarly, the 2022 EIS proposes no changes to the capacity of the current leachate treatment infrastructure (primarily sumps, pumps and batch reactors/storage), nor does it propose to any changes to the discharge limit set by the site's Trade Waste Agreement.

The EIS describes that leachate within the landfill collects within the leachate sump located centrally to the waste mass. Leachate is pumped from the sump to the onsite Wastewater Treatment Plant (WWTP) for processing. The WWTP is a series of sequential batch reactors with a combined treatment capacity of 600 kL of wastewater in 24 hours (configured as four x 110 kilolitre (kL) tanks that each have a decanting capacity of 50 kL/7-9 hours).

Following treatment, the wastewater is discharged to sewer under a Trade Waste Agreement (TWA) with Sydney Water. The agreement (Consent No: 35580) allows for discharge of a maximum daily discharge of 650kL and a maximum daily average of 550kL. These capacity limits represent a key constraint in terms of the Facility's ability to cope with large rainfall events, breakdowns or failures and/or other unexpected events capable of increasing leachate generation at the site.

[7] 2022 EIS, page 42.

4 Performance of leachate management system

In addition to internal waste characteristics (e.g. waste composition, particle size, compaction and moisture), the rate of leachate generation depends on various factors associated with the local environment. Biochemical factors in the waste degradation process, temperature, potential groundwater inflows and rainfall each influence the rate, composition and volume of leachate generated at the site. [8,9]

The Facility's 2019 and 2020 Annual Reviews (the most recent available reports) were reviewed to provide an insight into the operational performance of the leachate management system, particularly leachate volumes and accumulated levels within the landfill mass. Rainfall data from the Bureau of Meteorology's (BOM) rainfall station closest to the facility (Prospect Reservoir #067019) was also reviewed.

A total of 705 mm of rainfall was recorded in 2019 at the Prospect Station. For this same period, the total treated leachate volume generated at the Eastern Creek facility was approximately 175,000 m^3, averaging 479 m^3 per day.

For the year 2020, the recorded rainfall total was higher (by some 80%) at 1,282 mm. Records for the treated leachate volume during that year are not publicly available, but it follows that leachate generation at the facility would have increased compared to the 2020 figures, resulting in further accumulation of leachate in the waste.

For 2021, rainfall recorded up to 28 June totalled 685 mm (or 97% of the total annual rainfall that fell in 2019). Whilst the 2021 Annual Report for the Bingo Facility was not available at for review at the time of preparation of this report, it is likely that the high rainfall levels, coupled with no changes to the site's leachate treatment and discharge capacity, will have resulted in further accumulation of leachate volumes within the waste mass.

Both the 2019 and 2020 Annual Reports provided a conceptual model of the site indicating the height of leachate accumulation within the waste. Those figures are included for reference in Appendix 3.

In 2019[10], the level of leachate was cited as -19m AHD or 46m above the pit floor. The level of leachate reported as of 31 December 2020 was 12 m AHD.[11] This figure indicates a depth of leachate in the waste mass of approximately 78 m above the pit base, or an increase of 32 m within a year. This is in a stark contrast with the Proponent's estimation indicated in ERM 2008 Leachate Collection System Concept Design, which suggested that given the site's current leachate pumping system, leachate levels in the landfill could be limited to 3 m above the pit base.

The leachate generation volumes identified in the 2019 and 2020 reports are well in excess of the volumes predicted in ERM's 2008 Leachate Collection System Concept Design. The site's EPL and MOD6 approval were granted based (in part) on the modelling and predictions of that 2008 ERM report. Thus the foundation of those approvals appears flawed, given the clear disparity between the predicted leachate levels and actual leachate levels generated at the site.

The 2022 EIS afforded the Proponent the opportunity to review and address the disparity between the leachate generation predictions of the 2008 ERM report and the actual conditions measured onsite. Given that the 2022 EIS was produced to address SEARs pertaining to a proposal to substantially increase he Facility's throughput, and the history of odour generation issues experienced at the site, such a review should have occurred.

[8] Rezapour S, Samadi A, Kalavrouziotis IK & Ghaemian N (2018). Impact of the uncontrolled leakage of leachate from a municipal solid waste landfill on soil in a cultivated-calcareous environment. Waste Management 82, 51–61.

[9] Arunbabu V, Indu KS & Ramasamy EV (2017). Leachate pollution index as an effective tool in determining the phytotoxicity of municipal solid waste leachate. Waste Management 68, 329–336.

[10] 2019 Annual Environmental Review – Eastern Creek Recycling Ecology Park.

[11] Figure 6-2, 2020 Annual Environmental Review – ECREP, page 40.

We note that the site's ability to treat leachate and discharge the treated waters offsite is limited by two factors:

1. The capacity of the site's leachate treatment system, with a series of sequential batch reactors with a combined treatment capacity of 600 kL of wastewater in 24 hours; and
2. The discharge limit set by the Trade Waste Agreement (TWA) with Sydney Water, (Consent No: 35580, which allows for a maximum discharge of 650kL/day and a maximum average of 550kL/day).

As no changes are proposed to the site's leachate treatment system or TWA discharge limit, the leachate level in the landfill will remain excessive.

The 2022 EIS cites (but does not define) 'atypical' rainfall as a key cause of excess leachate generation at the site. It states (at page 194):

> *'during March to June 2021, the EPA received an increase in odour complaints from residential suburbs surrounding the Eastern Creek REP, prompting EPA to issue a clean-up notice (in April 2021) and EPL variation (in May 2021) to resolve odour issues.*
>
> *The sudden increase in odour complaints was attributed to atypical rainfall events which resulted in significant volumes of rainwater infiltrating the landfill, increasing the potential to produce LFG and generation of fugitive odour.*

This admission is telling in that the current site leachate management regime (and indeed proposed unchanged leachate management regime) is essentially defenceless against 'atypical' rainfall events.

Flow rate and flow duration following large rainfall events significantly influence the volume of inflow into the leachate sump at the site. Thus the calculation and estimation of these influences necessarily considers the local rainfall/climatic characteristics, the catchment area and the physical attributes of the landfill mass.

To calculate leachate generation under conditions where 'significant volumes of rainwater' infiltrate the landfill, we used:

- parameters derived from the Proponent's 2022 EIS and previous annual reports (i.e. capacity of leachate management devices including pump, storage, pipes etc)
- local rainfall data that is 'atypical' (i.e. the highest recorded 24-hour rainfall total, which was 170 mm[12] recorded at the closest rain station to the site, which is the Bureau of Meteorology's Erskine Park Reservoir - see Drawing No. 12138_002); and
- the landfill catchment of 26.68 ha.

Under these conditions, the site catchment receives up to 45 ML of rainfall in a day.

Considering the ERM 2008 report approach[13], together with recent meter readings for the leachate pump-out within the site of 62,740 kL during the period from April 2019 to end of January 2021[14], and total rainfall of 3,248 mm within the same period, the maximum one-day leachate generation approximates 3,196 kL – well in excess of the 872 kL maximum predicted by ERM 2008. Graphical representations of this leachate generation extrapolation and prediction (based on ERM 2008) are included in Appendix 2.

Furthermore, the Proponent's leachate management system appears to have not considered lag time (i.e. for infiltration through the waste/cover surface to reach the base of landfill mass and therefore migrate towards the leachate sump). This has the potential to further increase accumulation of leachate. To that end, a study from the United Kingdom[15] reports lag times of 12 hours for 2 m depths of municipal solid waste (MSW) to 2 days for 5 m of MSW. The study suggest that time lag is a factor of great importance, considering the hydraulic properties that influence flows within landfills (such as saturated hydraulic conductivity and porosity).

[12] Rain observed at nearest BOM station #67066 (Erskine Park Reservoir, 150.80°E, 33.81°S) recorded on 10 February 2020. A copy of this data is provided in Appendix 3.

[13] Crespi Project (June 2011), Spreadsheet water balance model, ERM (2008).

[14] Bingo Industries (February 2021), Soil, Water and Leachate Management Plan (SWLMP).

[15] Knox K (2006). A study of the hydraulic response of landfills to infiltration events. Paper presented in Waste Conference held in Stratford Upon Avon, UK.

4.1 Leachate levels and EPL criteria

The Proponent is required to manage leachate levels in accordance with the Leachate Management Conditions included in EPL 13426. These provisions were based on the modelling and analysis completed for the EIS and in general accordance with the *Draft Environmental Guidelines, Landfilling (DECC, 2008),* which were in force at the time.

The EPL allows for storage of leachate within the waste mass provided that '*leachate levels within the landfill (below RL 25m AHD) are maintained at least 5m below the minimum elevation of the waste surface'*.[16] This condition effectively permits the leachate level within the landfill mass to continue to increase to levels well beyond the predictions of underlying modelling. Clearly there is a tension between this and the generation of odours from the storage of leachate within the waste mass.

4.2 Leachate levels and current standards

The current guidelines for landfilling in NSW are the EPA's Environmental Guidelines, Solid Waste Landfills, Second Edition, 2016 ('the 2016 EPA guidelines'). Whilst not in force at the time of the Facility's original application, the 2016 EPA guidelines are current for the lodgement and determination of Bingo's 2022 expansion application. The 2016 EPA guidelines include various leachate management requirements relevant to the Bingo Facility, including the following requirement to minimise leachate levels within the waste mass:

> *Leachate in excess of the waste's field or holding capacity should be continuously withdrawn from the cell to ensure that the depth of leachate over the liner does not exceed 300 millimetres or some other maximum level justified in the design of the cell. The leachate level should at all times be below the lined capacity of the cell.*

That requirement is in stark contrast to the reported 78 m of leachate over the liner in 2020.

Whilst the 2016 EPA Guideline allows for 300 mm above the liner or '*some other maximum level justified in the design*', our recent experience in NSW and QLD (where the same 300 mm restriction applies) indicates that the depths of leachate reportedly present in the Bingo Facility in 2020 would no longer be permissible. In our view it would be difficult, if not impossible, to justify a design where these levels of leachate are allowed to accumulate within the waste mass.

4.3 Leachate management and odour generation

The 2022 EIS acknowledged that rainfall cannot be prevented from entering the landfill and generating leachate, stating:

> *'Some water is unable to be prevented from entering the landfill such as rainfall that falls on the landfill surface and walls. If this water comes into contact with waste, it becomes leachate and will be managed through the site's leachate management infrastructure'*
>
> (Appendix H 2022 EIS, p.20).

and:

> *'Therefore, most leachate generation results from water entrained in the deposited waste or from heavy rainfall which inundates the waste prior to covering'*
>
> (2022 EIS, p.42).

Odour from leachate generation is not only an environmental nuisance. It contributes to air pollution and, without proper management, impacts upon the health of the receiving environment. Odour emissions from the Facility have caused public complaints regarding noxious gases and the potential for volatiles to impact upon local waterbodies. These issues have been documented as community concerns during public consultation recorded in the ECREP Optimisation SSD EIS Engagement Report (page 13). The Proponent's response in the same report (page 20) briefly lists several measures implemented to resolve odour issues from the site.

[16] EPL Condition O5.15.

Whilst treating the impacts of the odour issues is supported, the measures (i.e. flare system installation and odour monitoring) are squarely aimed at addressing noxious gases and odours after they are generated and released into the atmosphere. The measures do not address generation of leachate.

Based on the 2022 EIS, the landfill will continue to store and generate excessive levels of leachate, and therefore unnecessarily generate excessive landfill gasses. With a stated approach of flaring the gasses to treat the impacts, rather than making effective design changes to minimise leachate generation rates and levels within the waste mass, the proposal will remain constrained by leachate treatment and discharge facilities that are operating at or close to capacity.

In our view, this leachate management regime remains fundamentally at odds with the current EPA Guidelines for Landfilling in NSW.

4.4 Groundwater management issues

The proposal raises groundwater management concerns that are not addressed in the 2022 EIS. We note that the facility currently accepts:

- non-putrescible (C&D and C&I) waste types, including soil and waste containing asbestos; and
- residual waste (including green waste, and contaminants of potential concern, i.e., heavy metals, BTEX, TRH, PAH, VOC) [17] from MPC1 and MPC2 that cannot be recycled or reprocessed.[18]

In this context, given its excessive leachate levels and limited treatment/disposal capacity, the Facility poses a potential risk to the receiving environment through leachate interactions with local and regional groundwater.

Leachate quality varies over time and potentially contains heavy metals, hazardous compounds, soluble salts and organic waste products that can seep through soil and contaminate groundwater.[19] This concern is heightened by the site's proximity to nearby watercourses/receptors (depicted on Drawing 12138_002 in Appendix 1), including:

- Angus Creek, located adjacent the eastern site boundary;
- Ropes Creek, located approximately 380 m to the south (not the 700 m to the west mentioned in the Proponent report[20]); and
- The underlying Hawkesbury Sandstone (some 20 m below the pit floor), which is susceptible to groundwater contamination given the substantial driving head provided by the storage within the landfill of excessive levels of leachate.

Whilst a review of the groundwater contamination from the site is included in the 2022 EIS[21], the information upon which the review was based on is lacking, in our view. Groundwater contaminant transport modelling is not included, and this is a key deficiency. Of the limited information offered in the EIS is a statement that natural groundwater is expected to flow to the north-west and north under low hydraulic gradients.[22]

In our view, given the substantial volume and depth of leachate stored within the landfill and the lack of any active measures to reduce leachate levels under the increased throughput scenario, further investigation is essential. At a minimum, additional bores and monitoring is required to confirm the potentiometric contours and groundwater flow directions (prior and post landfill operation). This is essential to assess whether contamination will migrate off site.

A greater degree of groundwater investigation and assessment is essential in the historical context of groundwater levels at the site ranging between 5 and 12 m below the top of cap across the Eastern Creek REP.[23] The EIS notes that historical quarrying activities may have led to an increase in the fracturing of the surrounding shale

[17] 2022 EIS, page 228.

[18] 2022 EIS, page 24-26.

[19] Naveen BP, Sumalatha J & Malik RK (2018). A study on contamination of ground and surface water bodies by leachate leakage from a landfill in Bangalore, India. International Journal of Geo-Engineering 9(27).

[20] 2022 EIS, page 247.

[21] 2022 EIS, page 225.

[22] 2022 EIS, page 225.

[23] 2022 EIS, page 248.

geology and therefore may also have resulted in an increase in the permeability of the quarry, creating preferential groundwater flowpaths.

Whilst it is noted that the hydraulic conductivity of the Bringelly shale deep aquifer (occurring at -30 to -80 mAHD) is considered low (at ~0.011 m/day), the upper aquifer units (shallow and intermediate aquifer) from -30 to 70 mAHD)[24] exhibit a far greater hydraulic conductivity – up to 0.25 m/d. This means that the risk of contaminant transport through groundwater movement away from the landfill increases with the depth of leachate. This is a particular concern given that a shallow perched and intermittent groundwater system is located within the shallow fill and weathered shale and clay up to depths approximating 32 m bgl (or approximately at 2 m AHD) occurring in the west of the landfill. [25]

This indicates that the current active landfill waste level of approximately 29 mAHD (cited in the Proponent's report on 31 December 2020) is likely interacting with a groundwater system in a stratum with much higher hydraulic conductivity (up to 0.25 m/day or 91.25 m/year).

Leachate levels at the site as at 31 December 2020 were approximately 12 m AHD.[26] At that level, leachate can interact with the intermediate aquifer unit which is characterised as a poorly fractured (intermediate) stratum. The presence of highly weathered shale and sandstone around 70 to 40 mAHD[27] means the risk of pollutants moving through these materials into the regional groundwater level of 24 mAHD is increased.

We note that the site's EPL recognises the increased level of risk associated with landfilling at depths aligned with the regional aquifer and stipulates a number of management measures that must be enacted prior to commencement of filling at these elevations. The requirements include:

> *O5.14 One month before the level of waste in the void reaches RL 25m AHD, the Licensee must submit to the* EPA*: a detailed technical report regarding the upper floor liner; permanent leachate collection system design and; quality assurance program.*
>
> *O5.15 No waste is to be emplaced in the pit above RL 25m AHD until the licensee has installed a permanent leachate barrier and collection system in accordance with a design approved by the EPA and the EPA has provided the licensee with written approval to dispose of waste in the pit above RL 25m AHD.*
>
> *O5.16 Prior to construction of the upper floor liners (25 AHD) and permanent leachate collection systems, the licensee must submit to the EPA a detailed design report including a construction quality assurance (CQA) program. The report must contain: details of the engineered features of the liner and leachate collection and conveyance system, leachate storage and disposal infrastructure, stormwater management controls, gas management system, proposed daily and intermediate covering, proposed filling plan and groundwater and gas monitoring networks. This must include detailed plans and specifications and full "for construction" engineering drawings. The CQA program must contain sufficient details of the proposed installation methods, tests, inspections and other verifications to demonstrate that all materials and constructed features will conform to the required plans and specifications. The design report and CQA program must be submitted to the EPA at each stage for approval prior to commencing construction works.*

Based on the information presented in the 2022 EIS and available Annual Reports, it is unclear whether these activities have occurred.

[24] 2020 AER, page 39.
[25] 2022 EIS, page 225.
[26] 2020 AER, page 40.
[27] 2020 AER, page 39.

5 Conclusions

Our review of the 2022 EIS confirmed that the proponent continues to operate the facility on the basis of retaining large volumes of leachate within the waste mass beyond the predictions of its site water balance modelling.

The EIS afforded the Proponent the opportunity to review and address the disparity between the leachate generation predictions of the 2008 ERM report and the actual conditions measured onsite. In the context of the proposed increased waste throughput and odour generation issues experienced at the site this review should have occurred.

The level of leachate within the waste mass continues to increase and the Proponent proposes nothing to address the discrepancy between the predicted leachate generation volumes, the actual leachate generation volumes and the apparent odour generation issues at the site. The EIS states that no changes are proposed to the landfill operations or leachate management as a part of the Proposal.

Excessive leachate levels within the landfill will continue to generate landfill gasses and therefore odour issues. The proponent's approach is to flare the gasses to treat the impacts, rather than to propose effective design changes to minimise leachate generation rates and increase leachate treatment and discharge capacities. To that end, the proposal remains constrained by leachate treatment and discharge facilities that are operating at or close to capacity.

In our view, this leachate management regime remains fundamentally at odds with the current EPA Guidelines for Landfilling in NSW.

In summary:

- The facility generates more leachate than was predicted by the underpinning modelling.
- Leachate volumes being stored within the landfill in 2019 and 2020 were in excess of the modelled predictions indicating accumulation of leachate up to -19m AHD in 2019 and 12m AHD in 2020 (some 46m in 2019 increasing 78m in 2020).
- Rainfall recorded in 2021 and to date in 2022 were also elevated, indicating that the levels of leachate in the pit are likely to have increased further.
- The EPA has identified the leachate collection system (including the leachate riser and vent pipe) as an odour pathway. The Proponent has constructed and implemented a flare system to manage these gases.
- Gas production (and therefore odour) increases with increased moisture content. In simple terms, the more moisture within the waste mass the greater the odour generation.
- The form of the gas generated is determined by the type of waste present, for example, construction and demolition landfills produce large amounts of hydrogen sulfide (rotten egg gas), often due to the presence of plaster board (gypsum board).
- The leachate treatment and discharge facilities are likely to be operating at or close to capacity, limiting the Facility's ability to reduce the accumulated leachate levels within the landfill.
- The current leachate management practices (particularly the storage of large quantities of leachate within the waste mass) do not align with the current EPA Guidelines for Landfilling in NSW.
- Given that the depth and volume of leachate stored within the landfill is already unacceptably high, and that no changes are proposed to the leachate management regime under the increased throughput scenario, the intensification of site activities represents a risk to local and regional groundwater that is not assessed in the 2022 EIS.

6 Appendix 1 – Drawings

ORIENTATION

SCALE

0 1,000

metres

ROBINA
PO Box 4115 Robina QLD4230 07 5578 9944
Email robina@access.gs **www.access.gs**

LEGEND

East Creek Resource Ecology Park operational area

BOM stations

SOURCES

Image source: Nearmap image
Image dates: 19 May 2022
Cadastral: NSW Government Spatial Service

PROJECT

BINGO INDUSTRIES EASTERN CREEK RECYCLING ECOLOGY PARK (& LANDFILL)

CLIENT

Jacfin Pty Ltd C/o HWL Ebsworth Lawyers

DRAWING

SITE LOCATION AND BOM STATIONS

SCALE	DATE	DRAWN	CHECKED	PROJECT	DRAWING	REVISION
1:29 320@A3	04/08/2022	DKK	ELH	12138	001	000

GILBERT SUTHERLAND

ORIENTATION

SCALE

0 250

metres

ROBINA
PO Box 4115 Robina QLD4230 07 5578 9944
Email robina@access.gs **www.access.gs**

LEGEND

- East Creek Resource Ecology Park operational area
- Mapped hydroline
- Mapped hydroarea

SOURCES

Image source: Nearmap image
Image dates: 19 May 2022
Cadastral: NSW Government Spatial Service
Contours: DEM 1m grid, July 2017 LiDAR survey (ELVIS database)

PROJECT
BINGO INDUSTRIES EASTERN CREEK RECYCLING ECOLOGY PARK (& LANDFILL)

CLIENT
Jacfin Pty Ltd C/o HWL Ebsworth Lawyers

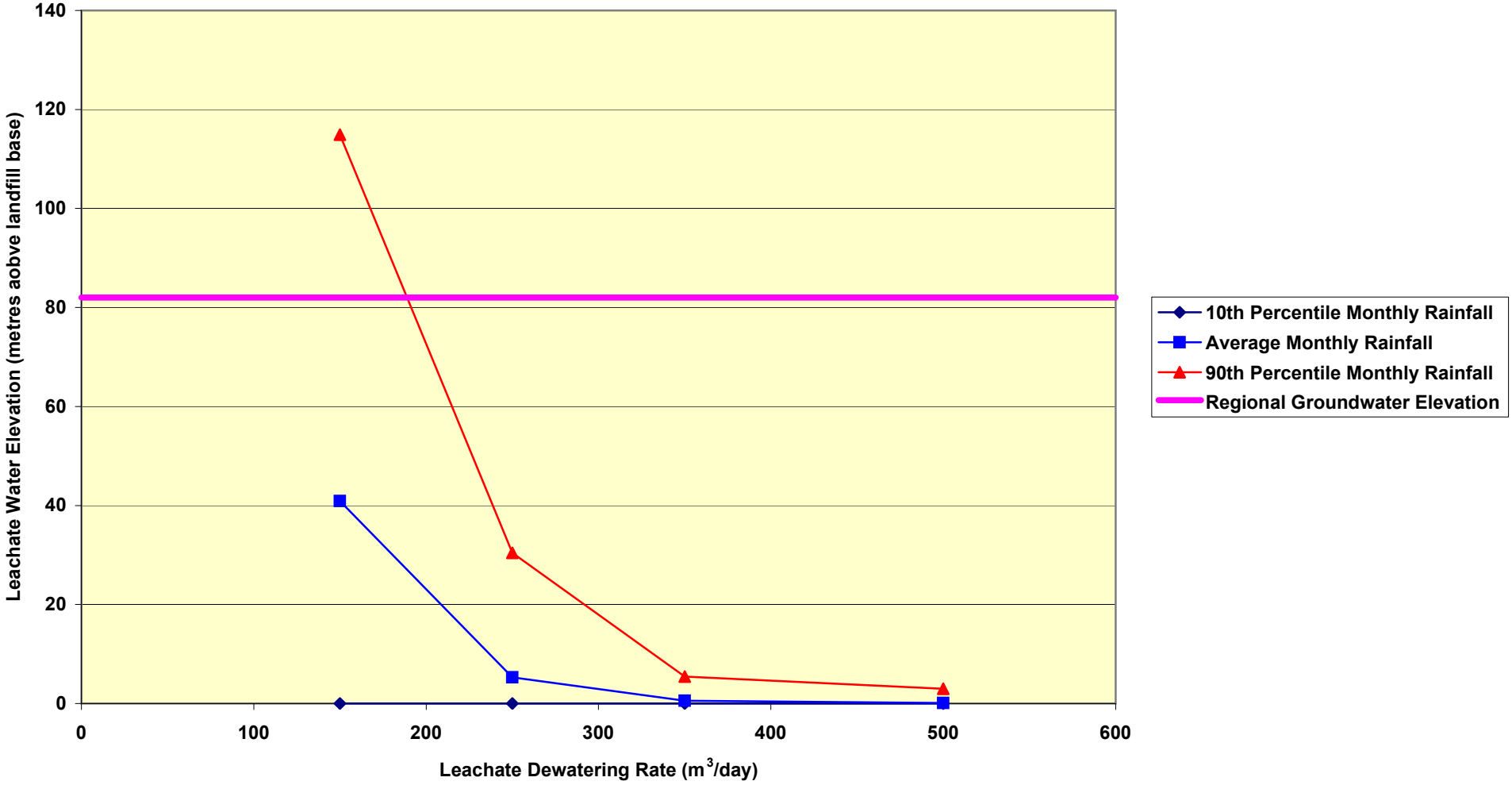
DRAWING
SITE LOCATION AND WATER FEATURES

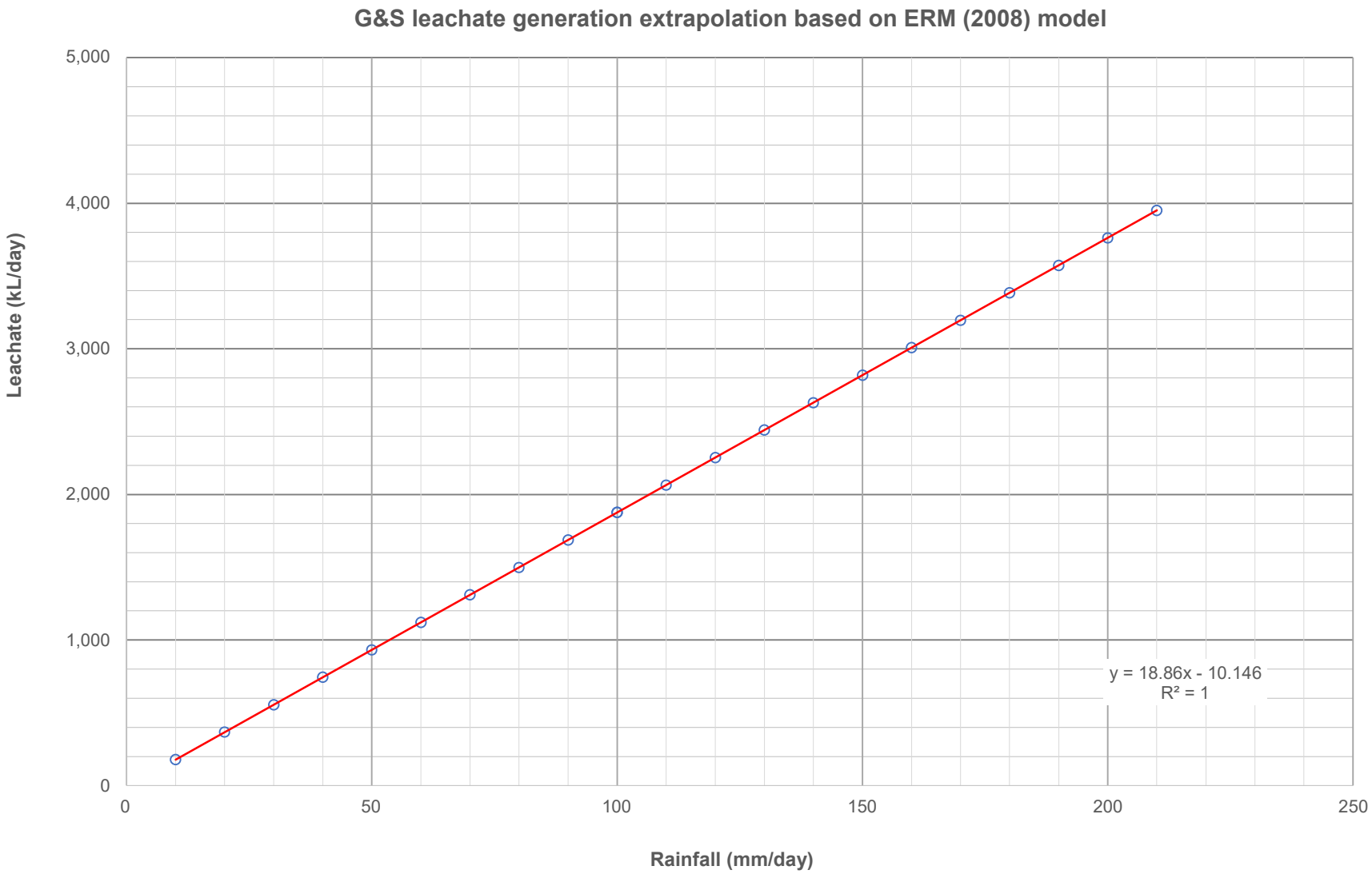
SCALE	DATE	DRAWN	CHECKED	PROJECT	DRAWING	REVISION
1:6 006@A3	04/08/2022	DKK	ELH	12138	002	000

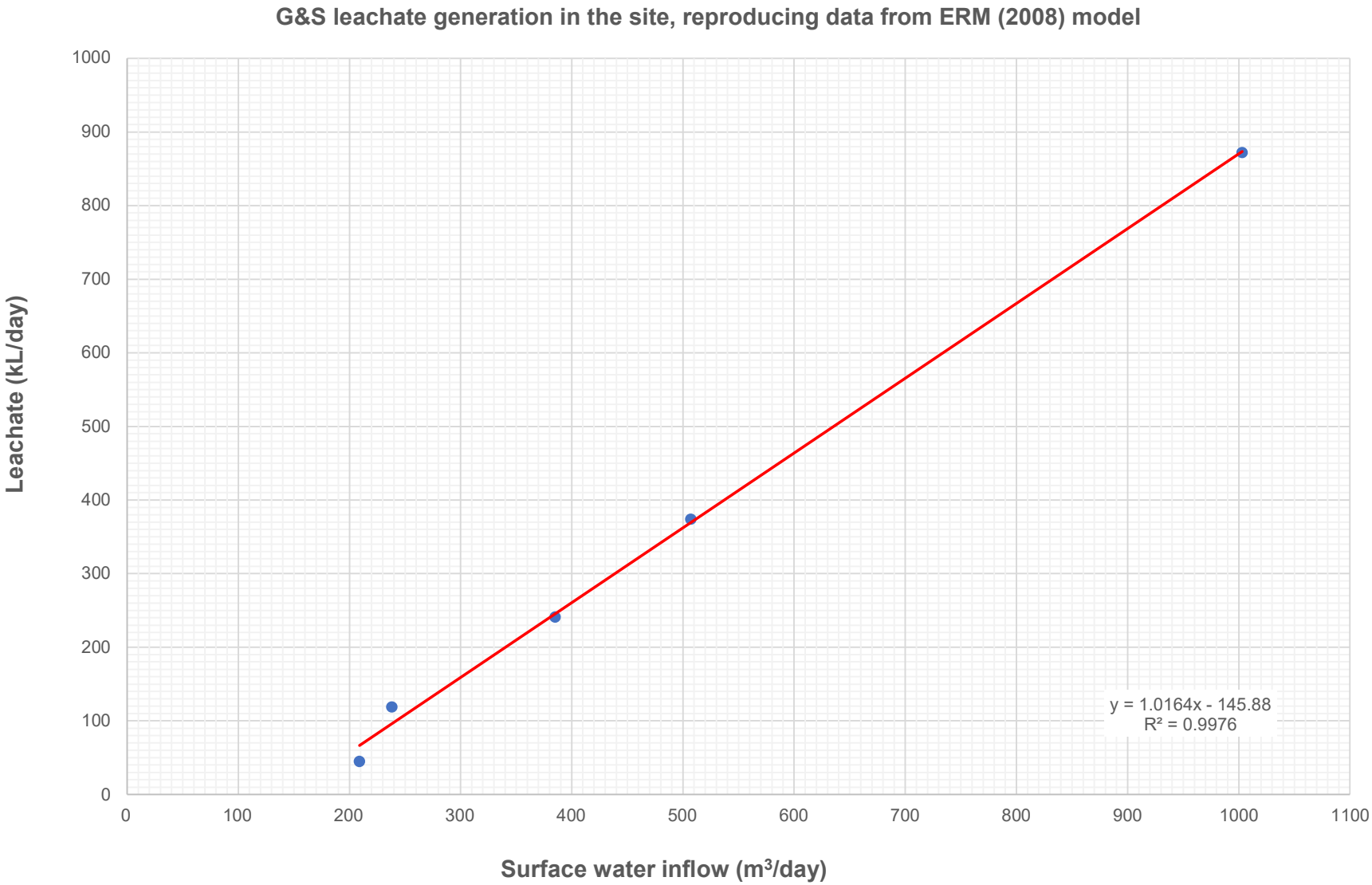
GILBERT SUTHERLAND

7 Appendix 2 – Leachate data graphical representations (based on ERM 2008)

Figure 6: Changes in Landfill Leachate Water Elevations with Changes in Leachate Dewatering Rates




G&S leachate generation extrapolation based on ERM (2008) model
Leachate (kL/day)
5,000
4,000
3,000
2,000
1,000
0
0
50
100
150
200
250
Rainfall (mm/day)
y = 18.86x - 10.146
R² = 1


G&S leachate generation in the site, reproducing data from ERM (2008) model
Leachate (kL/day)
Surface water inflow (m³/day)
y = 1.0164x - 145.88
R² = 0.9976
0
100
200
300
400
500
600
700
800
900
1000
1100

8 Appendix 3 – Conceptual site models

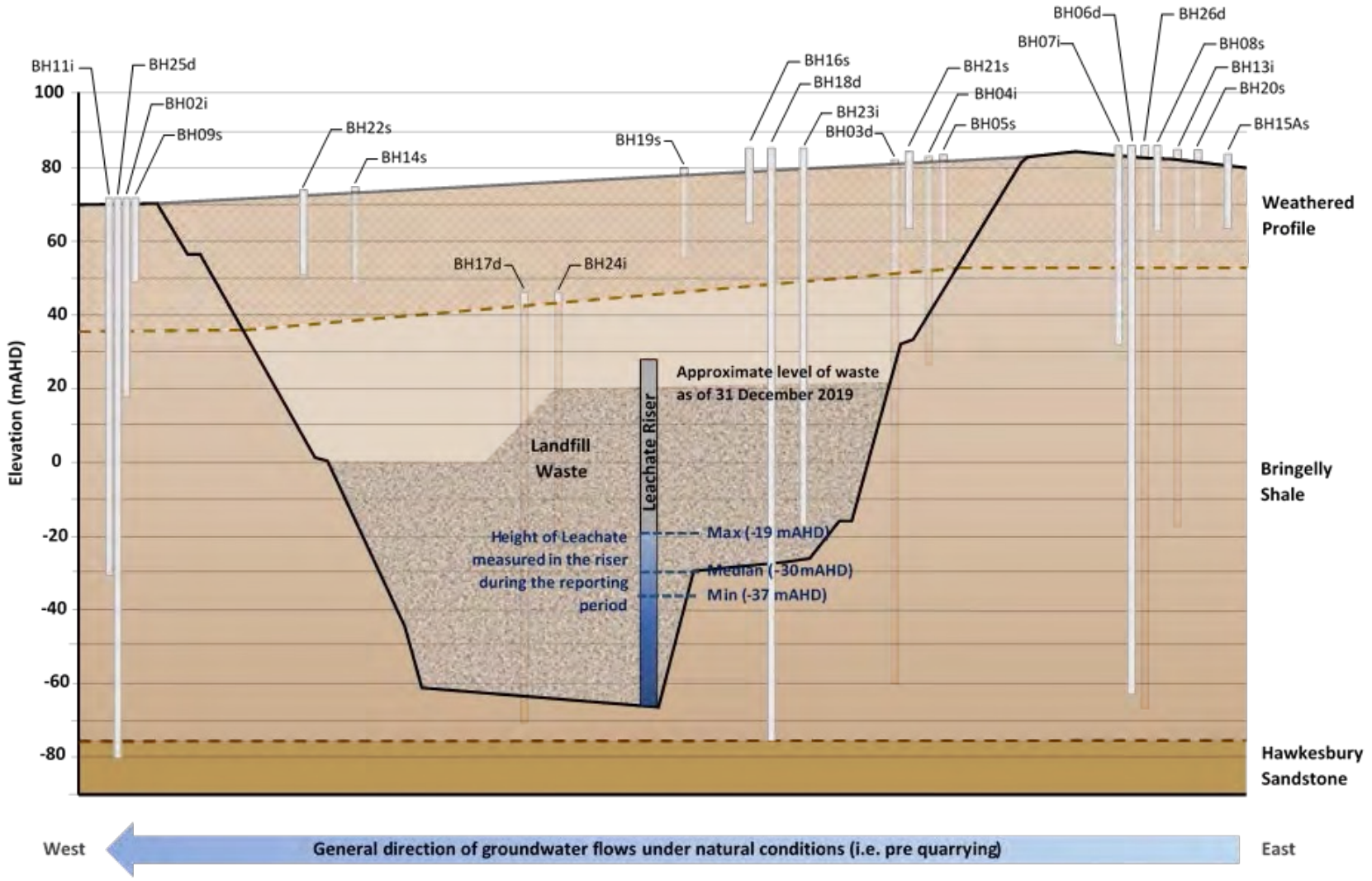


Figure 5-2: Conceptual Groundwater Monitoring Network Cross Section

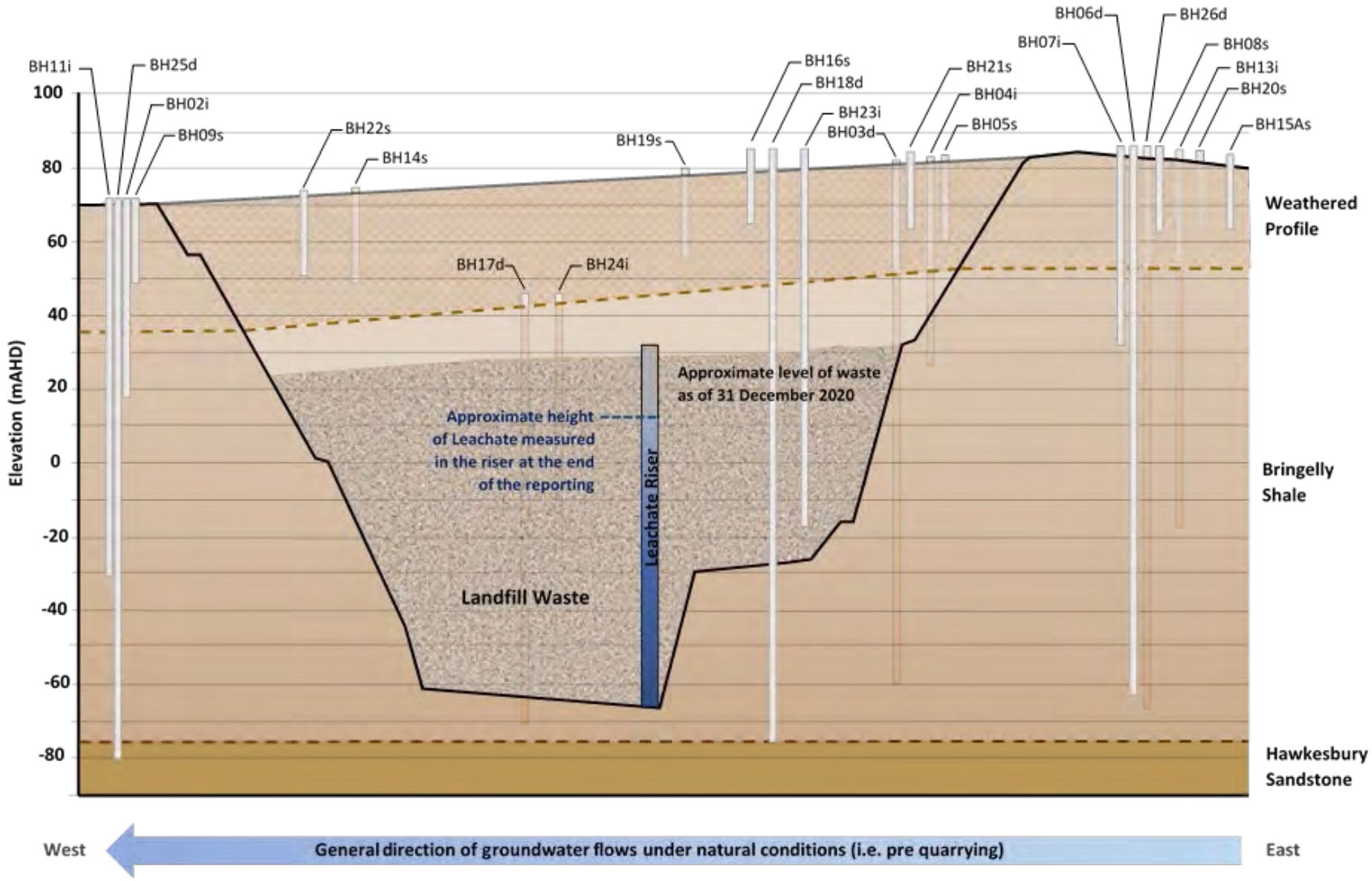


Figure 6-2: Conceptual Groundwater Monitoring Network Cross Section

9 Appendix 4 – Rainfall data

Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. About rainfall data

Station: Erskine Park Reservoir **Number:** 67066 **Opened:** 2013 **Now:** Open
Lat: 33.81° S **Lon:** 150.80° E **Elevation:** 85 m

Key: Units = mm *12.3* = Not quality controlled. ↓ = Part of accumulated total

2020	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	0	0	12.0	0	0	0	0	1.0	7.0	0
2nd	0	0	0	2.0	0	0	0	0	0	0	2.0	3.0
3rd	0	34.0	0	7.0	0	0	0	0	0	0	0	2.0
4th	0	0	29.0	10.0	0	0	0	0	0	0	0	0
5th	0	0	8.0	0	0	0	0	0	3.0	0	3.0	0
6th	0	1.0	20.0	0	0	0	0	0	0	0	17.0	7.0
7th	0	36.0	0	0	0	0	0	0	0	0	0	0
8th	6.0	43.0	4.0	0	0	1.0	0	14.0	0	0	0	0
9th	0	89.0	0	0	0	0	0	1.0	2.0	0	0	0
10th	0	170.0	0	1.0	0	1.0	1.0	34.0	6.0	0	0	0
11th	0	0	0	9.0	0	0	5.0	1.0	0	0	0	0
12th	1.0	0	1.0	0	0	0	1.0	0	0	0	0	0
13th	0	23.0	1.0	0	0	1.0	1.0	0	0	13.0	3.0	0
14th	0	10.0	0	0	0	8.0	5.0	0	0	0	4.0	3.0
15th	0	0	11.0	0	0	0	0	8.0	0	0	0	6.0
16th	13.0	6.0	4.0	0	1.0	0	0	0	0	0	0	3.0
17th	7.0	0	4.0	0	0	0	0	0	0	0	0	6.0
18th	8.0	9.0	0	0	0	0	0	0	0	0	1.0	0
19th	5.0	17.0	0	0	0	0	0	0	1.0	6.0	0	1.0
20th	2.0	0	0	0	0	0	0	0	7.0	0	0	2.0
21st	0	0	0	0	1.0	11.0	0	0	4.0	0	7.0	0
22nd	0	0	0	0	28.0	0	0	0	0	0	2.0	26.0
23rd	0	2.0	0	0	1.0	0	0	0	0	0	4.0	0
24th	2.0	0	0	0	1.0	0	0	0	0	8.0	1.0	0

2020	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
25th	*3.0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*29.0*	*0*	*0*
26th	*0*	*0*	*26.0*	*0*	*0*	*0*	*9.0*	*0*	*0*	*38.0*	*0*	*1.0*
27th	*0*	*0*	*1.0*	*0*	*1.0*	*0*	*91.0*	*0*	*0*	*3.0*	*0*	*8.0*
28th	*0*	*0*	*0*	*0*	*0*	*0*	*10.0*	*0*	*0*	*0*	*0*	*0*
29th	*1.0*	*0*	*3.0*	*0*	*0*	*0*	*0*	*0*	*0*	*11.0*	*0*	*15.0*
30th	*0*		*1.0*	*13.0*	*0*	*0*	*0*	*0*	*0*	*29.0*	*0*	*8.0*
31st	*0*		*0*		*0*		*0*	*0*		*0*		*3.0*
Highest Daily	*13.0*	*170.0*	*29.0*	*13.0*	*28.0*	*11.0*	*91.0*	*34.0*	*7.0*	*38.0*	*17.0*	*26.0*
Monthly Total	*48.0*	*440.0*	*113.0*	*42.0*	*45.0*	*22.0*	*123.0*	*58.0*	*23.0*	*138.0*	*51.0*	*94.0*

Annual total for 2020 = *1197.0* mm

Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Highest Daily	*52.0* 28th 2015	*170.0* 10th 2020	*119.0* 3rd 2022	*93.0* 21st 2015	*28.0* 22nd 2020	*99.0* 6th 2016	*166.0* 5th 2022	*34.0* 10th 2020	*57.0* 18th 2019	*43.0* 5th 2018	*57.0* 29th 2018	*48.0* 14th 2018

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. Observations of daily rainfall which span more than one day are shown in light grey, indicating that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

Product Code: IDCJAC0009 reference: 88553153

Page created: Wed 03 Aug 2022 17:05:04 PM AEST

Monthly rainfall

The Monthly rainfall is the total of all available Daily rainfall for the month. Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipiation that reach the ground, such as rain, drizzle, hail and snow.
About monthly rainfall

Station: Erskine Park Reservoir **Number:** 67066 **Opened:** 2013 **Now:** Open
Lat: 33.81° S **Lon:** 150.80° E **Elevation:** 85 m

Key: Units are millimetres. *12.3* = Not quality controlled.
Period for calculating statistics: (•) All years ( ) 1961-1990

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2013							*0.0*	*7.0*	*20.0*	*3.0*	*139.0*	*31.0*	
2014	*18.0*	*68.0*	*144.0*	*43.0*	*5.0*	*31.0*	*10.0*	*118.0*	*26.0*	*59.0*	*51.0*	*169.0*	*742.0*
2015		*25.0*	*45.0*	*286.0*	*44.0*	*72.0*	*30.0*	*43.0*	*9.0*	*35.0*	*108.0*	*56.0*	
2016	*247.0*	*8.0*	*23.0*	*14.0*	*9.0*	*228.0*	*57.0*	*67.0*	*51.0*	*11.0*	*19.0*	*55.0*	*789.0*
2017	*26.0*	*56.0*	*260.0*	*34.0*	*9.0*	*76.0*	*1.0*	*21.0*	*1.0*	*45.0*	*40.0*	*39.0*	*608.0*
2018	*13.0*	*66.0*	*33.0*	*11.0*	*7.0*	*47.0*	*1.0*	*4.0*	*34.0*	*128.0*	*94.0*	*134.0*	*572.0*
2019	*75.0*	*24.0*	*170.0*	*15.0*	*11.0*	*48.0*	*20.0*	*18.0*	*92.0*	*39.0*	*23.0*	*0.0*	*535.0*
2020	*48.0*	*440.0*	*113.0*	*42.0*	*45.0*	*22.0*	*123.0*	*58.0*	*23.0*	*138.0*	*51.0*	*94.0*	*1197.0*
2021	*53.0*	*93.0*	*353.0*	*4.0*	*48.0*	*36.0*	*16.0*	*50.0*	*16.0*	*53.0*	*163.0*	*76.0*	*961.0*
2022	*119.0*	*203.0*	*507.0*	*91.0*	*65.0*	*2.0*	*358.0*						

2013 Go View a year of daily data

Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	74.9	109.2	183.1	60.0	27.0	62.4	61.6	42.9	30.2	56.8	76.4	72.7	772.0
Lowest	13.0	8.0	23.0	4.0	5.0	2.0	0.0	4.0	1.0	3.0	19.0	0.0	535.0
5th %ile	14.8	14.4	27.0	6.8	5.8	10.0	0.4	5.2	4.2	6.2	20.6	12.4	546.1
10th %ile	16.5	20.8	31.0	9.6	6.6	18.0	0.9	6.4	7.4	9.4	22.2	24.8	557.2

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Median	50.5	66.0	144.0	34.0	11.0	47.0	18.0	43.0	23.0	45.0	51.0	56.0	742.0
90th %ile	157.4	250.4	383.8	130.0	51.4	106.4	146.5	77.2	59.2	130.0	143.8	141.0	1055.4
95th %ile	202.2	345.2	445.4	208.0	58.2	167.2	252.2	97.6	75.6	134.0	153.4	155.0	1126.2
Highest	247.0	440.0	507.0	286.0	65.0	228.0	358.0	118.0	92.0	138.0	163.0	169.0	1197.0

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use.

Gaps occur in the table where there are missing valid daily observations within the month. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

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10 August 2022

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HWL Ebsworth
Level 14, Australia Square Tower
267-278 George St
Sydney NSW 2000

Attention: Paul Lalich

Dear Paul

Bingo Eastern Creek Expansion

1 Introduction

You asked me to review documentation relating to Bingo Industries' plans to expand its Eastern Creek operations. You provided me with the Eastern Creek Recycling Ecology Park Recycling Infrastructure Optimisation Project (SSD-11606719) Environmental Impact Statement dated June 2022 and copies of appendixes E, F, H, I, J, K, L, M, N, O, P, Q, R, S and T.

2 Proposed Development

The EIS states that Bingo plans to increase the throughput at the facility by 950,000 tonnes per year. The current throughput is 2 million tonnes per year and, if approved, this would raise the throughput to 2.95 million tonnes per year. Bingo also plans to construct a vehicle workshop, bin manufacturing facility and make other changes to optimise internal infrastructure such as roads and stormwater.[1]

The EIS was prepared in accordance with the Amended SEARs issued on 1 October 2021.[2]

3 Review of EIS

The following are my comments on various parts of the EIS. The appendixes do not deal with waste management, so I have not examined them in any detail. I have confined my comments to those parts of the EIS relating to waste management. Generally, the EIS is comprehensive and of high quality although there are some areas lacking in detail. This has resulted in, among other things, not all of the waste management SEARs being addressed.

Words in italics are directly from the EIS.

[1] p xxvii
[2] p xxvii

3.1 Environmental management plans

The EIS states that The following environmental management plans have been developed in support of the EMS: Waste Monitoring Program (WMP)[3]

This is not provided.

3.2 Waste Generation and Justification

There is also limited recovery of mixed C&I waste in Greater Sydney. The Proposal would significantly increase the recycling capacity and diversion of waste from landfill in Greater Sydney and make a key contribution to NSW achieving the C&I recovery targets in addition to C&D recovery targets.[4]

The recycling rate for C&I waste was only 53 per cent in 2017-18 against a target of 70 per cent and Table 4-2 Relevant C&I targets and progress.[5]

The NSW Waste and Sustainable Materials Strategy 2041 shows that C&D waste is already at 80% recovery and C&I waste steady at 53%. C&I recovery has been short of the 70% target for five years. Expanding the capacity of the Bingo facility will probably make no difference to this. Financial considerations are what drive C&I waste diversion rather than providing additional capacity. This is why C&D waste is recovered well, because it is dense and expensive to landfill.

The Disposal-based audit Commercial and industrial waste stream in the regulated areas of New South Wales dated May 2015 shows that 28.4% of the C&I waste stream is garbage bags, most likely originating from the retail and mixed small business sectors which, according to the data, make up 28.9% of sources of C&I waste. This is not a stream the Bingo facility is likely to accept and closer examination of the composition of the C&I waste stream bears this out.

The composition of the C&I waste stream is shown in Table 1.

Table 1 Composition of the C&I waste stream[6]

Material	Percent
Food	26.3%
Garden organics	3.2%
Glass	2.7%
Masonry	1.0%
Metals	3.3%
Paper	25.2%
Plastic	20.9%
Rubber	0.8%
Textiles	3.4%
Wood	0.6%
Other	6.0%

[3] p xxviii
[4] Page xxxvii
[5] Page 83
[6] Page 3 of the Disposal Based Audit Report

Material	Percent
Cardboard	6.0%
Electrical	0.5%
Total	99.9%

The materials processed by the MPC1 and MPC2 at the Bingo facility are shown in Table 2-4 Waste volumes and types (existing)[7] and Figure 2-4 Existing waste management flowchart[8]. The proportions of these materials in the C&I waste stream are shown in Table 2 below.

Table 2 Percent of C&I Processed at MPC1 and MPC2

MPC1 and MPC2	Percent Processed
Plastic, cardboard, metal	30.2%
Clean bricks	0%
Green waste	3.2%
Wood waste	0.6%
Concrete, bitumen, soils, sand, bricks, sandstone	1.0%
Total	35.0%

The table shows that 64.9% of the C&I waste stream cannot be processed at the Bingo Facility and that expanding the processing capacity of MPC2 will likely have little effect on C&I diversion in Sydney because the Bingo facility does not process most of the materials in the C&I waste stream.

Planning for future non-putrescible waste management: The projected increase in population and associated economic growth, as well as numerous current and upcoming large infrastructure projects in Greater Sydney will result in significant increases in non-putrescible waste generation. The proposed increase in throughput of the Eastern Creek REP provides necessary waste infrastructure for both C&D waste generated during construction as well as C&I waste generated by new businesses.[9]

The linkage of waste generation with economic and population growth indicates the majority of that increase will occur in Greater Sydney.[10]

With the projected increase in population and associated economic growth of Sydney, and in particular Western Sydney, it is anticipated that there will be a significant increase in the baseline volume of non-putrescible waste requiring management.[11]

Waste growth is not necessarily a function of population growth. No information or data is provided to show projected C&I or C&D waste quantities in the future other than quoting the National Waste Report.

Eastern Creek REP is approaching its current two Mtpa throughput limit, with this limit to be reached within the next few years.[12]

No evidence is provided of this. No waste data or projections to support this assertion are provided.

[7] Page 24
[8] Page 26
[9] Page xxxvii
[10] Page 82
[11] Page 82
[12] Page 4

Figure 4-3: Bingo network waste flows[13]

No numbers are shown, however, if the Eastern Creek facility is accepting 2 million tonnes per year, this represents 60% of Bingo's total waste stream, according to this figure. The 40% balance therefore is 1,333,333 tonnes making the total amount of materials collected by Bingo to be 3,333,333 tonnes. Compared to the 21,147,000 tonnes estimated in the National Waste Report as the total amount of C&I and C&D waste generated in NSW in 2018-2019, Bingo handles 16% of the total and an additional 950,000 t will increase this by just 4.5%, unlikely to solve the state's C&I and C&D waste problem.

If the amount of C&I and C&D waste increases to 37 million tonnes in 20 years, the proposed additional 950,000 t will make up just 2.6% of this. Bingo is overstating the effect of the additional quantities on the Sydney C&I and C&D waste market.

In particular, the utilisation of latent capacity within MPC2 has potential to considerably improve recovery of the C&I waste stream where recovery rates are currently low[14]

The Proposal supports this objective as it would increase the resource recovery capacity of the Greater Sydney region and increase the throughput and efficiency of critical resource recovery infrastructure to being capable to process up to 2.95 Mtpa of C&D and C&I waste[15]

No data is provided to show how much C&I material is processed at the site, would be processed or could be recovered and what affect this would have on NSW or Sydney diversion rates. If 950,000 tonnes are somewhere between 2.6% and 4.5% of the total about of C&I and C&D waste generated in NSW over the next 20 years, then its effect on increasing resource recovery capacity will be minimal.

Increase diversion of C&D and C&I waste from non-putrescible landfill in Greater Sydney, which the 20 Year Waste Strategy (DPE, 2021a) estimates will be exhausted in 2028.[16]

The Proposal would significantly increase the recycling capacity and diversion of waste from landfill in Greater Sydney,... [17]

No details are provided of the affect the increase in processing quantities will have on diversion in Sydney. How much of the additional material will be recovered is not stated. As stated above, the effect is likely to me minimal.

The projected increase in population and associated economic growth, as well as numerous current and upcoming large infrastructure projects in Sydney will result in significant increases in non-putrescible waste generation.[18]

Waste growth is not necessarily driven by population growth. No evidence is provided that waste from existing major infrastructure projects is being processed at the site nor any evidence, such as contracts or agreements, that waste from future projects will be processed there.

[13] Page 87
[14] Page 89
[15] Page 90
[16] Page 407
[17] Page 407
[18] Page 407

3.3 Circular Economy

Alignment with the NSW circular economy: The Proposal supports the critical shift in approach to waste management in NSW, from producing low cost, low grade materials to a pull through model that conceives of generating usable and market demanded products using an integrated, closed loop solution.[19]

The Eastern Creek REP promotes a circular economy and reduces disposal costs for process residuals by diverting material from landfill and keeping products and materials in use by governments and industry.[20]

4.1.5 Circular economy outcomes[21]

The Proposal supports the implementation of a circular economy in NSW, as detailed in Section 4.1.5, as it directly relates to an increase in throughput of waste undergoing resource recovery and reducing the quantity of waste going to landfill. Bingo's investment in recycling and resource management infrastructure is aimed at closing the resource loop, by generating usable and market demanded products from recycled material.[22]

A waste separation facility can be part of a circular economy, but no data or information is provided to show that there is a demand for the products it produces or the size of markets or what customers or even industries the separated materials are supplied into. No details are provided of the markets into which products are supplied, nor any evidence provided that Bingo is involved in the reuse or remanufacturing of the products it separates. This information would be required to show that circular economy principles are being adhered to.

Promote a circular economy hub[23]

Promote a circular economy hub and reduce disposal costs for process residuals by diverting material from landfill and keeping products and materials in use by governments and industry in accordance with 20 Year Waste Strategy and the NSW Circular Economy Policy Statement – Too Good to Waste (NSW EPA, 2019)[24]

Bingo's position that its facility is a circular economy hub is incorrect. A circular economy hub is not proposed and this is not an possible outcome. Bingo's separation process is entirely linear with material entering the site, separated and leaving the site. The facility currently separates C&I and C&D waste delivered to the site and separated materials are then taken off-site. No manufacturing reused or remanufacturing of products takes place on site. None of the materials separated are used on site. There is no evidence that a circular economy hub will be created and there are no closed loop or circular economy activities taking place on site.

3.4 Alternative sites

Alternative site: Several alternative sites in the Sydney Metropolitan area were assessed. This scenario was rejected as there is no available land large enough to accommodate such a facility while being a sufficient distance from potentially sensitive land uses. The location of the Proposal is well placed geographically to service the Greater Sydney region and would utilise the significant benefits that come from co-location with an existing waste management facility.[25]

[19] Page xxxvii
[20] Page 84
[21] Page 87
[22] Page 90
[23] Page 81
[24] Page 407
[25] Page xxxviii

It's not possible that alternative sites were seriously considered because the MPC2 has already been built and is about to start operating. The EIS states it has latent capacity[26] and the main aim of the application is to fill this capacity.

A throughput increase of 1.5Mtpa had originally been sought based on the latent capacity available at the Eastern Creek REP.[27]

This has since been lowered to 950,000 tonnes per year but it demonstrates that no other site was considered because this is the site that had capacity. It also shows that the MPC2 was built with excess capacity and Bingo is now seeking approval to meet that capacity rather than there being a need to increase capacity because there are additional quantities.

Reducing the potential for impacts to the natural environment (e.g., land clearing) compared to a greenfield site by utilising an existing brownfield industrial site for development[28]

Several alternative sites in the Sydney Metropolitan area were assessed.[29]

Bingo has investigated the availability of other suitable sites in the Sydney Metropolitan area for processing large quantities of C&D and C&I waste.[30]

No evidence is provided that any other site, let alone a greenfield site, was considered for this application. There are no details of what the alternative sites were considered, their location or characteristics, why they were considered, what criteria were used or why they were rejected.

3.5 Relationship with Next Gen Facility

There is no linkage between the Eastern Creek Energy from Waste (EfW) (SSD 8477614) facility and the Proposal (the expansion of the Bingo facility). It is noted that the EfW project is unlikely to proceed, based on the recent NSW Government announcement of the NSW Energy from Waste Infrastructure Plan.[31]

Table 6-2: Key consultation aspects for consideration and responses – community stakeholders[32] states that The combustion of waste does not form part of the Proposal. The Proposal does not propose any changes to the processing activities already occurring onsite. There is no linkage to the Next Generation Energy from Waste (EFW) facility.

This is at odds with documentation provided in the case of TNG v IPC & Ors which says that Bingo will be supplying feedstock through a conveyor to the Next Generation Facility. TNG Feedstock Review. TNG v IPC No. 2019/13009 dated 28 May 2021 and prepared by MRA Consulting Group, states that 552,000 tonnes, the full complement of feedstock for the Next Generation Facility, will be supplied from three sources:

- Stream 1 – Bingo Network Processing Facilities - Residual waste from processing of mixed C&D waste processed at Bingo C&D facilities other than MPC1 and MPC2
- Stream 2 - Bingo MPC1 (and in future MPC2) - Residual waste from processing of mixed C&D waste processed at MPC1 (and in future MPC2)

[26] Page xxxi, page 7, page 77
[27] Page 5
[28] Page 88
[29] Page 407
[30] Page 93
[31] Page xlviii
[32] Page 123

- Stream 3 - Mixed C&I Waste - Residual waste from processing of mixed C&I waste processed at MPC1 (and in future MPC2).

The totals in Table 3: Eligible feedstock from Bingo C&D network, Table 4: Eligible feedstock from Bingo MPC1 (and in the future MPC2) and Table 5: Eligible waste from mixed inert C&I waste streams are all stated to be Tonnes committed and contracted to TNG Facility.

…the Proposal would include the installation of solar on the buildings at Eastern Creek REP with an estimated 1 MW in size, capable of producing over 1.3 Mkwh (sic) of electricity per annum,…[33]

This statement indicates that the Bingo facility will not be relying on energy generated from the Next Generation facility proposed to be development on an adjacent property and to which Bingo has indicated it will supply feedstock.

In September 2021 the NSW EPA updated their (sic) Energy from Waste Policy Statement and the Energy from Waste Infrastructure Plan to reflect the latest advice on air emissions standards from the NSW Chief Scientist and Engineer. The updates require that EfW projects be located away from high density residential areas within prescribed Energy from Waste Priority Infrastructure Areas, unless the proposal is using energy generated from waste to replace less environmentally sound fuels (including coal or petroleum based fuels) to power the industrial and manufacturing processes on-site. As the project (the Eastern Creek Energy from Waste facility - SSD 8477614) is not for these purposes and located in a high-density residential area there is potential this project may not proceed as it does not comply with the updated Energy from Waste Policy Statement and Energy from Waste Infrastructure Plan.[34]

This EIS concludes that the Next Gen facility:

- does not use energy generated from waste to replace less environmentally sound fuels to power the industrial and manufacturing processes on-site
- is located in a high-density residential area and
- does not comply with the updated Energy from Waste Policy Statement and Energy from Waste Infrastructure Plan.

Eastern Creek Energy from Waste (SSD 6236)….is also located at the same location as the Eastern Creek EfW development (SSD 8477614). As outlined above, this project may not proceed on the basis that it does not comply with the Energy from Waste Policy Statement and the Energy from Waste Infrastructure Plan.[35]

This EIS concludes that the Next Generation facility does not comply with the updated Energy from Waste Policy Statement and Energy from Waste Infrastructure Plan.

3.6 Creating Competition

The Proposal would deliver substantial benefits in terms of providing a sustainable resource recovery facility for residents of Sydney's west, and by creating choice and competition within Sydney for resource recovery.[36]

[33] Page 91
[34] Page 360
[35] Page 360
[36] Page xlx

The opposite is likely as the EIS states that Bingo manages a significant proportion of the Sydney Basin C&D and C&I waste streams through the operation of a network of critical waste management infrastructure including transfer stations, advanced recycling facilities and landfills[37] so increasing the capacity of this facility will increase Bingo's processing capacity and further concentrate the processing market in Bingo's hands rather than provide competition.

3.7 Operation of Chute

In a number of places, the EIS states that waste will be landfilled via a conveyor and through a chute that feeds the landfill.

Residual waste is transferred directly by conveyor to the landfill.[38]

Recycled product outputs from MPC2 are transferred by conveyors to either the timber yard, SMA, the storage bays on the eastern boundary of MPC2 or (in the case of residual waste) to the landfill via the landfill chute.[39]

Product collection from MPC1: – The majority of product generated by MPC1 is directed via conveyor either to the timber storage yard or the SMA. Residual waste would be directed straight into the landfill pit via the chute.[40]

Small additional quantities of residual waste may enter the landfill via the chute.[41]

We are not aware if the chute is operating. The last we saw of the chute it did not appear to have been repaired since a fire at the site in February 2020.

3.8 Inconsistencies in Waste Flows

Table 2-4 Waste volumes and types (existing)[42] shows that up to 1 million tonnes per year, excluding residual chute waste, of Third party direct deliveries of Residual waste (C&D and General Solid Waste (non-putrescible) and also 150,000-250,000 tonnes per year of Residual mixed waste from MPC1 and MPC2 are currently processed.

The table makes no mention of the WTS.

Figure 2-4 Existing waste management flowchart does not show any waste going from MPC2 to the landfill. Only waste from the WTS and MPC1 goes to landfill.

Residual waste from the MPCs or SMA that cannot be recycled or reprocessed is also sent to landfill. Residual, non-recyclable waste from the MPCs is transferred to the landfill through the landfill disposal chute, via enclosed conveyors.[43]

Figure 2-4 Existing waste management flowchart does not show any waste going from MPC2 to landfill. Only waste from WTS and MPC1 goes to landfill.

[37] Page xxxi and page 7
[38] Page 17
[39] Page 18
[40] Page 34
[41] Page 67
[42] Page 24
[43] Page 27

Recycled outputs from the advanced recycling plant are transferred via enclosed conveyors to external storage and processing areas within the broader Eastern Creek REP (SMA) and timber yard or for residual waste directly to the landfill via the landfill conveyor.[44]

Product collection from MPC2: – Some of product generated by MPC2 is directed via conveyor either to the timber storage yard or the SMA. Residual waste is directed straight into the landfill pit via the chute.[45]

Figure 2-4 Existing waste management flowchart does not show any waste going from MPC2 to landfill.

3.9 Sources of Waste

Incoming wastes accepted at the MPC1 includes:[46]

- Black iron
- Baled mill rejects
- Clean heavies
- Gyprock
- Heavy gauge steel
- Mixed metals
- Non-ferrous metals
- Timber

These are not the materials listed in Table 2-4 Waste volumes and types (existing) as Typical waste types being delivered to the MPC1 - Mixed or co-mingled C&D, and C&I waste consisting of metals, brick, concrete, plasterboard, soil, aggregates, plastics and a range of building and demolition wastes.

Black iron and Clean heavies are not terms commonly used in the waste management industry and ought to be defined with specificity in the EIS.

Waste disposal and product collection vehicles originate from various locations across Greater Sydney.[47]

Table 3-9 Waste types and volumes with Proposal[48] lists the sources of waste received for processing. This includes Third party direct deliveries, Bingo fleet direct deliveries and Transfer stations and RRCs for each part of the facility.

The table provides no details of which facilities waste originates from, their operators, locations or the quantities that will be delivered from each. The SEARs require details of the source of the waste streams to strongly justify the need for the proposed increase in waste receival and processing capacity. This detail is lacking.

Given that a large portion of the incoming product would be sourced from transfer stations.[49]

[44] Page 29
[45] Page 34
[46] Page 27
[47] Page 33
[48] Page 66
[49] Page 71

Table 3-9 Waste types and volumes with Proposal[50] lists the sources of waste received for processing but the proportions are not shown. Given that a large portion of the incoming product would be sourced from transfer stations,[51] details should be provided for what transfer stations, their locations, operators and quantities and details of any supply agreements.

These projects include the Western Sydney Airport, West Metro, M12 Motorway, Western Harbour Tunnel and Beaches Link. Waste from these infrastructure projects would typically consist of general construction waste, asbestos contaminated waste and soil material and is consistent with waste currently disposed of at Eastern Creek REP.[52]

Construction has already commenced at the Western Sydney Airport and the Western Harbour Tunnel. No evidence has been provided that Bingo is accepting waste from these projects. No waste supply agreements are provided to show that waste from other projects will be provided to Bingo.

3.10 Outputs

These product streams are on-sold to third parties for use offsite generally for infrastructure and major projects, or further resource recovery.[53]

No details are provided as to who the third parties are, their locations, what materials they will accept, the quantities or details of any agreements with them.

Infrastructure projects will also likely require recycled products provided by Eastern Creek REP[54]

No evidence of any supply agreements is provided or that any products originating from the Bingo facility are used on the projects already commenced or that any material originating from the Bingo facility has been supplied to any reprocessors which then provided products to the projects already commenced. In any event, these projects will supply C&D waste, which is already well recovered, rather than C&I waste.

During the design development, considerable attention was given to the operational capacity of the Eastern Creek REP as well as market needs and demands.[55]

The Proposal supports the critical shift in approach to waste management in NSW, from producing low cost, low grade materials to a pull through model that conceives of generating usable and market demanded products using an integrated, closed loop solution.[56]

No evidence is provided of the markets or customers that the material produced at the site is supplied into any information about where separated materials will be sent, used or reprocessed or that there is a demand for the products produced.

[50] Page 66
[51] Page 71
[52] Page 84
[53] Page 67
[54] Page 84
[55] Page 95
[56] Page 407

3.11 Agency Requirements

Table 18-2: Other agency requirements and relevant report sections (waste management). Blacktown City Council 4. Waste a. Details of the quantities and classification of all waste streams to be generated on site during construction and operation.[57]

Quantities of all waste streams to be generated are not provided. Under Construction, 746,900 m^3 of earthworks are mentioned as well as 162,250 m^3 of material from amenity berms and 100,000 m^3 are stated to be reused for construction. No quantities for the materials listed in Table 18-3: Waste generating activities during construction or Table 18-4: Construction waste and disposal methods are provided.

Under Operation, no quantities of any waste streams are provided.

3.12 Utilisation of MPC2

Bingo are (sic) proposing to enhance resource recovery outcomes across the Greater Sydney area by optimising their Eastern Creek REP to capitalise on the underutilised state-of-the-art processing facilities (namely MPC2), and plant and equipment within the Eastern Creek REP. The Applicant is therefore proposed to increase the total throughput of the Eastern Creek REP by 950,000 tpa and carry out infrastructure upgrade works across the Proposal Site (the Proposal).[58]

The Proposal would increase the waste throughput across Stage 1 and Stage 2 by 950,000 tpa. It is intended that the majority (if not all) of this throughput increase would be directed to MPC2, to capitalise on the underutilised potential of this infrastructure and enhance resource recovery in a meaningful way for the Greater Sydney region.[59]

The facility should have been built to process approved quantities of waste. If Bingo chooses to build it with greater capacity than has been approved that is not a good enough reason to then attempt to obtain approval to increase capacity, simply because capacity exists.

The design and capacity of MPC2 allows for larger vehicles (walking floor trailers) to drop off waste, allowing for higher loads to be transported per vehicle and reducing overall vehicle numbers across the Sydney road network.[60]

Bingo already has approval to operate the MPC2, so these efficiencies already exist. Increasing capacity will increase the number of heavy vehicles on the road, not decrease it.

3.13 Stockpiles and Onsite Storage of Waste

The maximum volume of waste / product stored on site at any one time is currently dictated by the one time storage limit of 667,000 tpa. However, Bingo is seeking to increase the stockpile authorised amounts as part of an application to the NSW EPA to vary EPL 20121 to a one time storage limit of 950,000 tpa. Final stockple (sic) volumes would be confirmed and approved as part of that process.[61]

[57] Page 335
[58] Page 47
[59] Page 65
[60] Page 92
[61] Page 30

The maximum volume of waste / product stored on site at any one time is currently dictated by the one time storage limit of 667,000 tpa under the EPL. However, Bingo is seeking to increase the stockpile authorised amounts as part of an application to the NSW EPA to vary EPL 20121 to a one time storage limit of 950,000 tpa. Final stockpile volumes would be confirmed and approved as part of that PL (sic) amendment process.[62]

Increasing stockpiling is not part of the application and is a licencing issue. If the additional stockpiling is not allowed, the Application must demonstrate how additional waste removal will be managed.

3.14 Other Inconstancies

The types of vehicles listed in Table 2-6 Existing vehicle types[63] do not match those listed in Table 2-7 Indicative existing composition of waste drop off vehicles[64], Table 2-8 Indicative existing composition of product collection vehicles and Table 2-9 Indicative current average daily vehicle movements at the Eastern Creek REP.[65]

The other key non-putrescible waste landfills are at or close to capacity, including Veolia Horsley Park, Blacktown Waste Services and Glenfield Waste.[66]

Putrescible waste is not accepted at the site, so these sections are irrelevant.

4 SEARs Check List

4.1 Waste management[67]

A description of each of the waste streams that would be accepted at the resource recovery operation and the landfill, including maximum daily, weekly and annual throughputs and the maximum size for stockpiles

Section 2.7.2 and Section 3.5.2

No maximum daily, weekly and annual throughputs or maximum size for stockpiles are included in this section and only indicative quantities shown.

Section 2.7.5

No maximum daily, weekly and annual throughputs or maximum size for stockpiles are included in this section. The weight of stockpiles is shown but not their size by volume. Waste materials have different densities and similar weights often result in different volumes of materials. This section states only that The larger stockpiles on site comprise concrete medium density, brick, non-crushed brick and non-crushed concrete (BC). Other stockpiles located onsite comprise mixed waste, aggregate (AGG), soil and ferrous metal (FE).

Details of the source of the waste streams to strongly justify the need for the proposed increase in waste receival and processing capacity

Chapter 4

[62] Page 70
[63] Page 38
[64] Page 38
[65] Page 39
[66] Page 83
[67] Page 420

No information on sources of waste is provided other than from Bingo's transfer stations. Table 2-4 Waste volumes and types (existing) states that Typical waste source includes Third party direct deliveries, Bingo fleet direct deliveries and Transfer stations and RRCs. Bingo's transfer stations are just one of three potential sources of feedstock and details of the other sources are not provided.

Section 2.7.2

Table 2-4 Waste volumes and types (existing) states that Typical waste source includes Third party direct deliveries, Bingo fleet direct deliveries and Transfer stations and RRCs. Other than Bingo's transfer stations, the locations of which are known, details of the other sources are not provided.

Section 3.5.2

Table 3-9 Waste types and volumes with Proposal states that Typical waste source includes Third party direct deliveries, Bingo fleet direct deliveries and Transfer stations and RRCs. Other than Bingo's transfer stations, the locations of which are known, details of the other sources are not provided.

A description of waste processing operation, including flow diagrams for each waste stream. The description should include information regarding the technology to be used, resource outputs, the quality control measures that would be implemented and the interactions between the resource recovery operations and the landfill operations

Section 2.7.3, Section 2.7.4, Section 2.7.6, Section 3.5.3, Section 3.5.6 and Section 3.5.8

None of these sections have a flow chart for each material. There is a flow chart, Figure 2-4 Existing waste management flowchart, in Section 2.7.2 Waste types and volumes,[68] however, this only shows limited detail.

Details of how and where waste would be stored (including the maximum daily storage capacity of the site) and handled on site, and transported to and from the site including details of how the receipt of non-conforming waste would be dealt with

Section 2.7.5

This section does not provide any information on where on site waste is stored other than at the SMA, MPC1, MPC1 Eco Products area and MPC2. No maps or site drawings are provided to show where materials are stored.

Details of the quality of waste produced and final dispatch locations.

Section 2.7.2

No information is provided on the quality of the waste produced. For example, there is no data on the composition of waste products, levels of contamination or proportions of non-complying materials present or whether the quality of the materials meets the customers' specifications.

No information is provided in final dispatch locations other than 'off-site' and 'landfill' in Figure 2-4 Existing waste management flowchart, and Product streams are on-sold to third parties for use off site or further resource recovery on page 25.

Section 3.5.2

[68] Page 26

No information is provided on the quality of the waste produced. For example, there is no data on the composition of waste products, levels of contamination or proportions of non-complying materials present or whether the quality of the materials meets the customers' specifications. No information is provided on final dispatch locations other than These product streams are on-sold to third parties for use offsite generally for infrastructure and major projects, or further resource recovery.[69]

Details of the waste management strategy for construction and ongoing operational waste generated

Section 18.4

Quantities of waste streams to be generated are not provided. Under Construction, 746,900 m^3 of earthworks are mentioned as well as 162,250 m^3 of material from amenity berms and 100,000 m^3 are stated to be reused for construction. No quantities for the materials listed in Table 18-3: Waste generating activities during construction or Table 18-4: Construction waste and disposal methods are provided. Under Operation, no quantities of any waste streams are provided.

Yours sincerely

ANDREW QUINN
Technical Director - Waste and Resources Management

Checked/
Authorised by:

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Jacfin Pty Ltd
C/- HWL Ebsworth Lawyers
Level 14, Australia Square
264-278 George Street
Sydney NSW 2000

Attention: Rhiannon Esau

Dear Rhiannon

Eastern Creek Recycling Ecology Park Expansion
1 Kangaroo Avenue, Eastern Creek
Review of SSD Traffic Matters

1 Introduction

1.1 Context

SLR Consulting Australia Pty Ltd (**SLR**) has been retained by HWL Ebsworth (**HWLE**) lawyers on behalf of Jacfin Pty Ltd (**Jacfin**) to undertake a peer review of the traffic engineering matters associated with the State Significant Development (**SSD**) application (SSD-11606719) for the expansion of the Eastern Creek Recycling Ecology Park (**the development**) located at 1 Kangaroo Avenue, Eastern Creek.

This document has been prepared to summarise a peer review of the traffic assessment submitted by the applicant, Bingo Industries Pty Ltd (**Bingo** or **the Applicant**), as part of the SSD application, and to document our professional technical opinion in relation to the key traffic engineering matters associated with the development.

1.2 Material Reviewed

SLR has reviewed the following documents of relevance to the development from a traffic engineering perspective:

- *Eastern Creek Recycling Ecology Park Recycling Infrastructure Optimisation Project (SSD-11606719): Environmental Impact Statement* report prepared by Bingo dated 18 May 2022 (**EIS**);
- *Eastern Creek Recycling Infrastructure Optimisation Project:* Traffic *Impact Assessment* report prepared by The Transport Planning Partnership (**TTPP**) dated 9 February 2022 (**TTPP TIA**).

2 Review of Traffic Matters

SLR has undertaken a review of the TTPP TIA and the traffic and transport related sections of the EIS and notes the below concerns in relation to the assessment of the development's traffic impacts.

2.1 Development Traffic Demand

2.1.1 Existing Traffic Demand

The 'existing' site traffic generation indicated in *Table 3.1* of the TTPP TIA is understood to be based on a first principles assessment, and not actual surveyed site traffic demands. SLR considers that the current first principles assessment is likely to underrepresent peak traffic demands associated with the existing site.

Traffic surveys of the existing site access to Kangaroo Avenue are required to verify existing site peak traffic demands and profiles across the day. 24-hour traffic surveys for several days of existing operations would be required given the proposed 24-hour operation of the site.

2.1.2 Proposed Traffic Demand

The development peak hour traffic demand estimates presented in *Table 6.2*, *Table 6.3* and other tables within the TTPP TIA are reliant on a flat profile of development traffic distributed evenly across a 24-hour period. SLR considers that this assumption requires further justification, which could be achieved by undertaking traffic surveys of the existing site access to Kangaroo Avenue over a 24-hour period.

It is expected that development traffic volumes at night would be lower than throughout the day, and hence daytime development traffic demands, including peak hour periods, are likely to be higher than has currently been assessed by TTP.

2.2 Cumulative Traffic Impacts of Surrounding Developments

Section 20.3.1 (Surrounding Developments) of the EIS indicates a number of proposed developments in the surrounding area. The TTPP TIA only makes a small allowance for background traffic growth (i.e. 0.6% - 2% per annum) on Wonderland Drive to the west of Wallgrove Road, which is unlikely to sufficiently account for the cumulative traffic generation impacts of these planned developments.

SLR considers that a revised traffic assessment is required, incorporating higher background traffic growth on Wonderland Drive to the west of Wallgrove Road in order to understand the cumulative traffic impacts of planned developments.

2.3 Intersection Assessment Issues

The following issues are noted in relation to the SIDRA Intersection assessment documented within the TTPP TIA:

- *Section 6.9* of the TTPP TIA indicates that all assessed intersections operate within acceptable thresholds, however, key metrics including Degree of Saturation (**DOS**) and 95th percentile vehicle queues are not reported. Of note, review of the SIDRA outputs included at *Appendix C* of the TTPP TIA indicates that the Wallgrove Road/Wonderland Drive intersection is over capacity (i.e. DOS of 1.04) for the existing situation in the PM Peak hour period. A DOS of >0.90 indicates that the operation of an intersection is constrained, and hence would require upgrading in order to accommodate additional traffic demands.
- Whilst not stated within the body of the report, SIDRA outputs included at *Appendix C* of the TTPP TIA indicate that analysis of the Wallgrove Road/Wonderland Drive intersection assumes cycle times of 149 and 126 seconds for the existing AM and PM peak hour periods respectively, however, assumes cycle times of 191 and 158 seconds in future modelling years. The adopted future year cycle times are unrealistic, and consequently report favourable results in terms of DOS and delay (i.e. the traffic impacts of the development are understated by the reported SIDRA results).

The following items relevant to intersection assessment have not been considered by the TTPP TIA:

- No surveys or operational assessment of the existing and proposed site access intersections to Kangaroo Avenue has been undertaken. SLR considers that assessment of all site access intersections is required to demonstrate appropriate operation and vehicle queuing provisions internal to the site.
- There has been no assessment of intersections on Wallgrove Road to the north and south of the Wallgrove Road/Wonderland Drive intersection. It is understood that there are existing operational/congestion issues on Wallgrove Road to the north of the Wonderland Drive, which are likely to also constrain the Wallgrove Road/Wonderland Drive intersection operations. SLR considers that assessment of additional Wallgrove Road intersections is required to demonstrate that the existing road network has sufficient capacity to accommodate the traffic demands generated by the proposed development.
- Traffic volumes for the assessed road network have been not provided, which makes it difficult to review the reported traffic generation and distribution and to evaluate the accuracy of the analysis undertaken. SLR considers that assessment traffic volumes for each movement of each assessed intersection should be provided for all scenarios.
- No SIDRA intersection layouts or signal phasing summaries have been provided. SLR considers that these additional SIDRA output summaries are required to confirm the validity of the SIDRA Intersection assessment inputs.

SLR considers that a revised traffic assessment incorporating the above matters is required to confirm the traffic impacts of the proposed development. Furthermore, further upgrades of the external road network are likely to be required in order to safely and efficient accommodate the traffic demands generated by the proposed development in light of the above commentary.

2.4 TfNSW and BCC Assessment Requirements

A number of Transport for NSW (**TfNSW**) and Blacktown City Council (**BCC**) traffic assessment requirements, as detailed in *Table 8-2* of the EIS, have not been sufficiently considered by the TTPP TIA. These assessment requirements are reproduced in **Table 1** followed by relevant commentary.

Table 1 Transport authority requirements not sufficiently addressed

Transport Authority Assessment Requirements	SLR Comments
TfNSW assessment requirements	
"This should also include details on the maximum number of vehicles per day and per annum that the proposed development will generate including a breakdown into vehicle types and how these numbers correlate to the daily and annual limits for which approval is being sought. Details on how maximum vehicle numbers will be monitored to ensure ongoing compliance should also be provided"	The TTPP TIA only identifies the proposed average number of daily vehicle movements, not the proposed maximum number of daily vehicle movements. Furthermore, no details are provided as to how maximum vehicle numbers will be managed by the Applicant. SLR considers that the requested information should be provided by the Applicant to establish whether the proposed maximum daily traffic movements could be problematic from an operational or safety perspective, and also how any related traffic impacts could practically be managed by the Applicant.
"Strategic/Concept Design: Should it be identified as part of preparing the Environmental Impact Statement or during the assessment of the application that mitigation measures are required that will impact a classified road, then a concept design for the proposed works will need to be prepared and submitted. This is needed to clarify the scope of works, demonstrate the works can be constructed within the road reserve and allow the consent authority to consider any environmental impacts of the works as part of their assessment."	No upgrading works to classified roads have been identified within the TTPP TIA. Given the existing constraints and traffic assessment deficiencies identified herein, it is likely that upgrades to Wallgrove Road and associated intersections will ultimately be required to accommodate the development.
BCC assessment requirements	
"All improvements to the road network are to be identified, costed and paid for by the developer"	No upgrading works to Council-controlled roads have been identified within the TTPP TIA as being delivered as part of the development. Given the existing constraints and traffic assessment deficiencies identified herein, it is likely that further upgrades to the Council-controlled road network (i.e. beyond that potentially completed by others in the future) will be required to be completed by the Applicant to accommodate the traffic demands associated with the development.

3 Summary and Recommendations

Based upon consideration of the traffic assessment material submitted in relation to the development, SLR recommends that the Applicant be requested to provide further information, as detailed herein, for consideration by DPIE and relevant transport authorities. In the absence of this additional information, SLR considers that the traffic impacts of the development cannot adequately be assessed, and the development ought to be refused.

Should you have any queries in relation to the information contained herein, please do not hesitate to contact the undersigned.

Yours sincerely

CHRIS LAWLOR
Principal - Transport Advisory