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16 December 2019

Kale Langford
Environmental Planner
KDC
Via email: kale@kdc.com.au

RE: Response to Submissions for Bulk Recovery Solutions, Ingleburn

Dear Kale,

The following outlines additional information and clarification to address the New South Wales (NSW) Environment Protection Authority (EPA) and Department of Planning & Environment (DP&E) submissions relating to the *Air Quality Impact Assessment Bulk Recovery Solutions, Ingleburn* (AQIA) (**Todoroski Air Sciences, 2018**).

Each of the key comments is shown in grey italics, and is followed by the response to the comment.

NSW EPA Submission

Potential for odour not adequately assessed

i. *The only potential odour sources, identified in the AQIA for the proposal, are from the stockpiling of foundry sand from the dissolved air flotation (DAF) treatment of liquid waste and the DAF system. It is proposed to process waste types that may have odour generating potential such as sewage sludge, grease trap oil, industrial waste water and waste oil and these waste types should be considered in the assessment. Adequate justification for omitting all odour sources except for DAF and foundry sand has not been provided.*

ii. *Mitigation measures proposed to minimise the generation of odour from the identified odour sources include blending foundry sand with other materials to dilute the material and the use of charcoal filters within the DAF process. However, the AQIA is lacking:*
   - *Plans, process flow diagrams and descriptions that clearly identify and explain all pollution control equipment and techniques for all processes on the premises*
   - *A description of all aspects of the air emissions control system, with particular regard to any fugitive emission capture systems (e.g. hooding, ducting), treatment systems (e.g. scrubbers, bag filters) and discharge systems (e.g. stacks)*
   - *The operational parameters of all emission sources, including likely operational variability*
   - *It has not been established how the proposed mitigation measures will be used to effectively minimise emissions from all potential odour sources at the premises*

iii. Adequate justification for the adopted odour emission rates has not been provided. The odour concentration and emission rates adopted in the AQIA have been sources from existing reports and publicly available data. It has not been adequately established how the odour emission data adopted in the AQIA is relevant to this project. Where emission data is sourced from publicly available literature (including previous assessment), the data must be adequately justified, including reference to the original test data and provision of the original test data report.

iv. It has not been established if the adopted odour emissions rates represent a reasonable worst case, and account for expected emission rate variability. The odour emission rate should reflect reasonable worst case and account for foreseeable variability in process. Additionally, the AQIA should include:

- *A detailed discussion of the methodology used to calculate the odour emission rates*
- *Detailed calculations of pollutant emission rates for each source*
- *All release parameters of stack and fugitive sources*

Liquid waste types including sewage sludge, grease trap oil, industrial waste water and waste oil which are proposed to be processed at the Project have been considered in the assessment.

The liquid wastes will be transported to site in vacuum sealed trucks and pumped directly from the trucks into sealed vacuum storage tanks located within the building enclosure for processing. The vacuum storage tanks will be fitted with carbon filters to treat the air ventilated during the filling of the tanks, and any such release occurs indoors. Overall, as the liquid wastes are not directly exposed to the air, and any emissions are treated with a carbon filter, there is no potential for significant odour emissions to arise.

A flow diagram showing the liquid waste process at the Project is presented in **Figure 1**. We note the treatment of drilling mud and muddy waters are also treated in the same liquid waste process. This liquid material is unloaded to a pit for collection and processing as shown in **Figure 1**.

The odour assessment incorporates conservative assumptions regarding the potential odour sources from the Project, such as modelling of the odour sources out in the open rather than within a building enclosure, and also not including any potential mitigation measures for the modelled odour sources. The ventilation extraction system for the DAF would include a hooded ventilation system discharging through charcoal filters before being released. However in the model the odour generated from the DAF is assumed to be untreated sludge odour. Hence the predicted impact of the process is likely overestimated.

Foundry sand does not generate exceptionally high odour levels that are difficult to manage, or a type of odour that is unusual in the context of an industrial area. The proposed mitigation measure is to blend the sand with other inert materials. This would cover most of the sand and thus supress odour emissions. This suppression has not been factored into the modelling, but the average odour emission rate was applied at a constant source to conservatively model the potential emissions.

The modelling assumes the sources emit odour at a constant rate out in the open and not within a building enclosure as would actually occur. The potential odour emissions generated at the Project would of course vary depending on the demand and waste material received at the Project and there would be no odour generated for a significant portion of the time.

As noted in the AQIA, the odour emission rates for the foundry sand were obtained from a study conducted by **Benbow Environmental (2016)** for Bulk Recovery Solutions. Site specific odour sampling for foundry sand was conducted by Stephenson Environmental Management Australia at Austral Alloys Pty Ltd. Duplicate samples in two areas within the foundry sand storage bays at the site were conducted to obtain an odour concentration for foundry sand. A summary of the measured odour results is outlined in **Table 1**. A copy of the odour test report from **Benbow Environmental (2016)** is provided in **Appendix A**. The average measured value is applied in the assessment.

Table 1: Summary of odour measurements for foundry sand

Sample ID	Odour concentration (OU/m^3)
1A	180
1B	270
2A	230
2B	200
Average	**220**

Source: **Benbow Environmental (2016)**

To represent the DAF system at the Project, it was assumed potential odour emissions would arise from the sludge capture of the DAF system. It was further conservatively assumed that the sewage sludge odour emissions represent the worst-case odour emission scenario for this source. **Table 2** presents a summary of the odour measurements for sludge bays reviewed for the assessment. The maximum odour concentration was applied as a conservative estimate for this source.

A copy of the original test report for the odour measurements for sludge is unavailable, however the test results are available, as presented in **Table 2**.

Table 2: Summary of odour measurements for sludge bay

Sample ID	Odour concentration (OU/m^3)
T - 1	114
T – 2	130
SM – 1	1,365
SM – 2	1,186
SM – 3	883
W - 1	2,054
W - 2	3,981
Maximum	**3,981**
Level used in Modelling	**3,981**

The odour sources at the Project have been modelled as volume sources as they are located within the building. The foundry sand has been represented as a volume of 2,621m^3 (19m x 14m x 10m) and the DAF sludge bay as 759m^3 (11m x 7m x 10m). The odour emissions for each source are estimated from the dimensions of the source with an assumed one air change per hour and the odour concentrations from **Table 1** and **Table 2**. As noted, the modelled odour sources have been assumed to emit at a constant rate and have been modelled out in the open and not within a building enclosure.

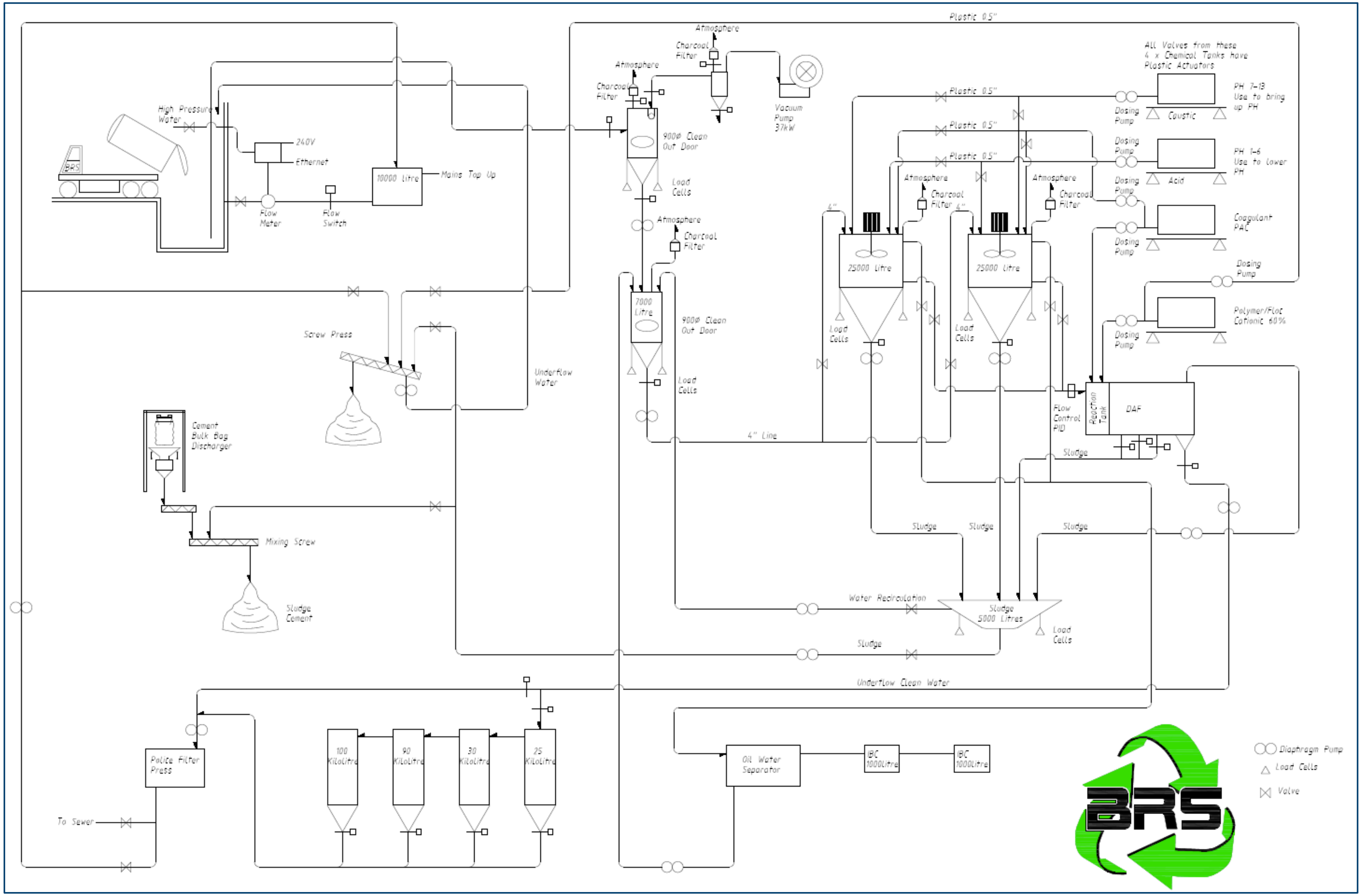

Figure 1: Flow diagram – liquid waste process

Emissions from solid waste processing

The solid waste processing at the project involves the crushing, screening and blending of materials to generate desired products. It is proposed that solid waste processing and raw material stockpiling is to occur within an enclosed space with water misting sprays applied to suppress dust within the building.

Only finished products are proposed to be stockpiled in outdoor areas in external storage bays. Water will be used to mitigate dust emissions and minimise wind generated dust emissions from this source.

Stockpiling of waste and processed material will occur on the south eastern area of the building in designated bays. It is intended that trucks will tip waste at the 'receival area' for distribution by front end loader to the stockpile bays. Smaller stockpile areas are located internally at the crushing plant and undercover at the screening plant.

Waste material arriving and being processed on site will comprise of a variety of waste types including building and demolition waste, foundry sand, reclaimed asphalt, hazardous soils, slag and fly ash. These waste types may contain non-trivial levels of contaminants materials including but not limited to Type 1 and Type 2 Substances (metals). However, the assessment has only considered dust emissions from the premises.

The AQIA should consider the potential for any air pollutants likely to be emitted from the various materials that will be delivered, stored and processed at the facility.

The Project was revised after completion of the AQIA, and reflects the AQIA. The changes to the Project include:

- No external waste stockpiles in the south eastern corner of the site;
- New internal stockpiles in north western corner of building to accommodate the waste material that would have been stockpiled in the south eastern corner; and,
- A revised storage capacity from 30,000 tonnes (t) to 15,000t at any one time on-site across all waste types.

A revised site layout is show in **Figure 2**.

The waste material including foundry sand, hazardous soils, slag and fly ash received at the project would be stockpiled internally. The material would be sufficiently wetted to ensure minimal dust emissions and hence minimal emissions of other contaminants to arise during the handling and processing of this material. The main processing activity for these types of material would be blending with other materials and then storage in the Concrete Batching Plant silos. For hazardous soils, the material would be stockpiled for the less than 24-hours before being processed.

Furthermore, as all of the handling and processing of this material would occur within the building enclosure, there would be no wind effects to act on the handling and stockpiling of material. It can be expected that this would further control any potential air emissions from this material by up to 70-80% and with sufficient moisture in the material, dust emissions from this would be negligible and any other emissions associated with the dust would be trivial.

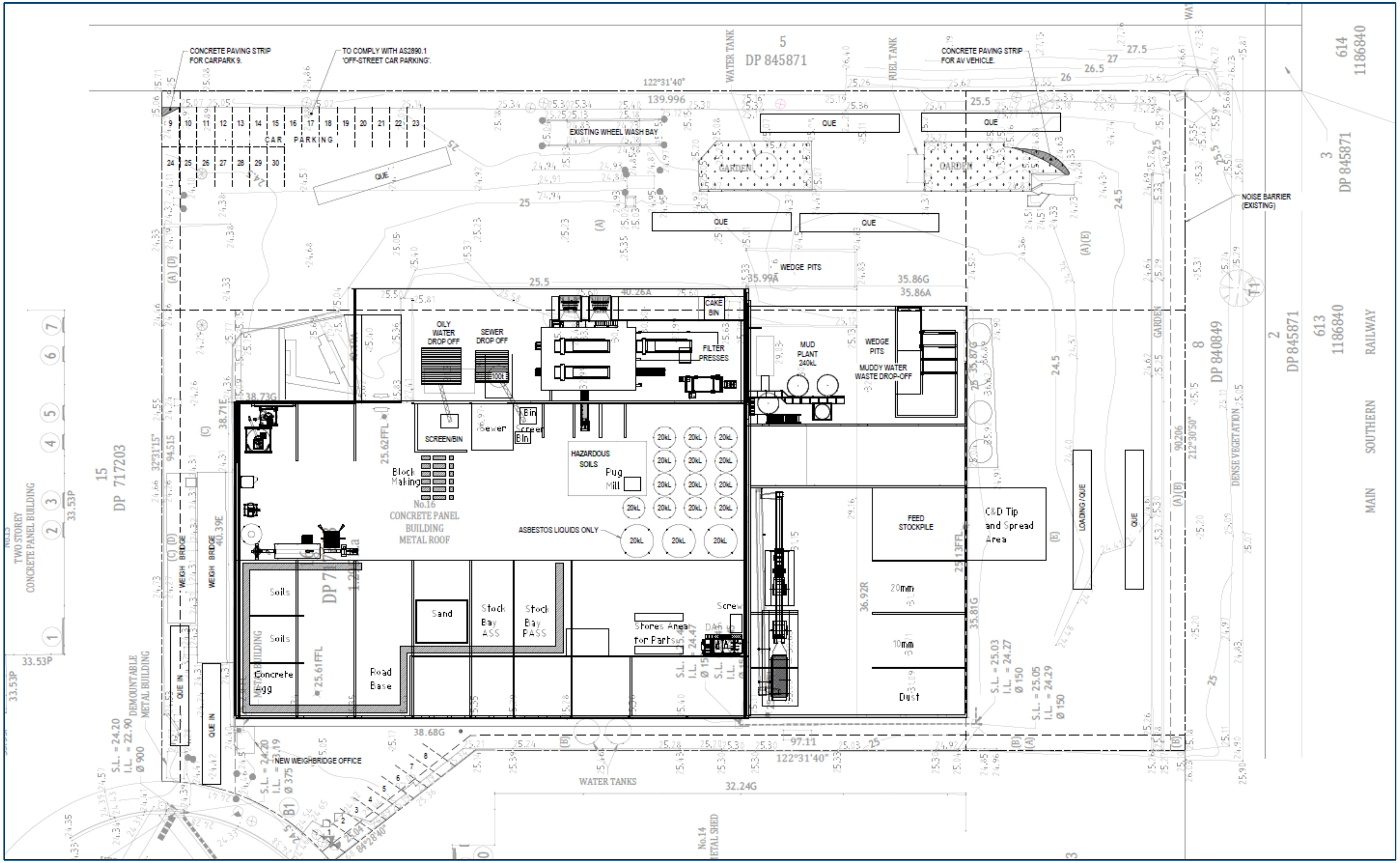

Figure 2: Revised site layout

<u>Maximum daily production rates</u>

The proposed masonry facility is assumed to operate 24 hours, 365 days per year and this has been reflected in the dispersion model. The emission rates adopted in the AQIA are based on emission factors referenced from emission estimation technique manuals and production throughputs.

However, it has not been described how the production throughput has been averaged. As such, it is unclear if the emission rates adopted in the AQIA reflect maximum daily activity rates and hence peak emission rates.

As detailed in the Approved Method for the Modelling and Assessment of Air Pollutants in NSW (Approved Method), a detailed discussion of the methodology used to calculate the expected pollutant emission rates for each source should be provided.

Additionally, if no data is available to describe the distribution of emission rates, the maximum measured or calculated emission rates should be used. Maximum daily rates should be calculated based on the maximum achievable daily processing rate for the facility, opposed to the daily average rate.

The peak operational rate of activity for the project and hence the peak dust emissions in any hour during these periods have been included in the dispersion model. Hourly dust varying emissions are modelled for a maximum activity scenario, and vary according to meteorological factors such as wind speed with higher wind speeds resulting in increased dust emissions. We note that the higher dust emissions during these periods do not always result in the highest impacts at receptors as vertical atmospheric mixing and hence air dispersion is also generally greater during these higher wind times.

The throughput of the Project is determined on the proposed maximum annual volume of waste that can be processed on site which is 225,000 tonnes per annum (tpa) (we note that this includes liquid and solid wastes combined). This provides a conservative estimate with typical quantities of solids processed at the Project which were calculated to be approximately 45,000tpa (**KDC, 2019**).

A maximum peak hourly production rate of 45 tonnes per hour for solids processed is estimated by the Proponent. The annual operating hours for this activity is calculated to be 4,850 hours per year which is used to calculate a peak hypothetical annual throughput of solids processed of 218,250tpa (45 x 4850).

The assessment is considered to overestimate the actual likely maximum daily processing rate for the Project.

DP&E Submissions

- *The AQIA does not consider adjacent industrial uses as receivers. Update the AQIA to include industrial receivers.*

It is acknowledged that some receptors, such as a boarding school or hospital may have sensitive individuals present for periods of time over which EPA criteria apply, and such receptors may (and generally would) be considered to be sensitive receptors. However, not all places where people work are automatically sensitive receptors at which the EPA criteria would apply.

All potentially sensitive receptors were considered in the AQIA. The existing industrial receptors were examined and were not considered to be sensitive receptors for any detailed assessment. The key factors considered were that only healthy adults would be present, and even then for much less than 24-hours over any day, whereas the EPA criteria are set at levels suitable to protect the most sensitive individuals in the community and such individuals would unlikely be present at the commercial facilities.

Workplace air quality standards are many times higher than the EPA criteria and are directly applicable to the places where people may work at the nearby industrial receptors. The workplace criteria are set at suitable levels to manage the health of adult workers present at the industrial receptors and compliance with such criteria would not tangibly be affected by the Project.

- *The AQIA does not consider potential emission sources including those that could be generated from the treatment of liquid waste and hazardous solid waste. Update the AQIA to include potential emission sources and update the modelling to identify potential impacts on industrial and residential receivers*

As outlined above, the treatment of liquid waste and hazardous solid waste at the Project would have a low likelihood of impacting the surrounding environment as these materials would only be processed in sealed systems, or have their emissions captured or be wetted to the point that no tangible emissions would arise and this would occur within a building enclosure, further reducing the scope for any off-site emissions.

The liquid wastes would be transported to site in vacuum sealed trucks and pumped from the trucks into sealed vacuum storage bins located within the building enclosure. The liquid waste process is a closed treatment system with minimal potential for odour emissions to arise.

The waste material including foundry sand, hazardous soils, slag and fly ash received at the project would be stockpiled and handled within the building enclosure. The material would be sufficiently wetted to ensure no tangible dust emissions and hence minimal emissions of other contaminants to arise during the handling and processing of this material. There would be no wind erosion from the stockpiling of material as they are not subject to wind effects within the building.

- *The modelling has not considered if roller door for the warehouse will be open or shut C&D processing. Provide clarification on whether the modelling took into consideration the building design and whether doors will be open or closed during operation.*

This is incorrect. As outlined in Section 6.3.1 of the AQIA (**Todoroski Air Sciences, 2018**), all sources at the Project are assumed to be located out in the open. That is, the dispersion modelling has not accounted for the potential reductions associated with the activity occurring within an enclosed building (door open or not) as proposed for the Project. The building enclosure would reduce dust emissions by approximately 70-90% by minimising wind effects, allowing for controlled moisture and preventing the travel of pollutants. The issue of a door in this context is not a tangible issue.

- *The EIS has not considered how dust will be managed from the crushing plant and include whether a baghouse will be required to manage dust from the crushing plant.*

This is incorrect. The modelling assessment applies controls to crushing plant. The controls include wet suppression. Refer to Table 8-1 in Section 8 of the AQIA (**Todoroski Air Sciences, 2018**).

Please feel free to contact us if you would like to clarify any aspect of this letter.

Yours faithfully,
Todoroski Air Sciences

Aleks Todoroski

Philip Henschke

References

Benbow Environmental (2016)
"Section 96 Report for Bulk Recovery Solutions 16 Kerr Road, Ingleburn NSW", prepared for Bulk Recovery Solutions by Benbow Environmental, July 2016.

KDC (2019)
"Environmental Impact Statement for State Significant Development – Proposed Expansion of Resource Recovery Facility", prepared by KDC, May 2019

Todoroski Air Sciences (2018)
"Air Quality Impact Assessment Bulk Recovery Solutions, Ingleburn", prepared for Koby Development and Property Consultants by Todoroski Air Sciences, December 2018.

Appendix A – Odour Test Report Foundry Sand

Odour Research Laboratories Australia

A Division of Peter W. Stephenson & Associates Pty Ltd
ACN 002 600 526 (Incorporated in NSW)
ABN 75 002 600 526

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Newington NSW 2127 Australia
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Olfactometry Test Report

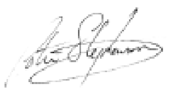
	The measurement was commissioned by SEMA on behalf of:	
Client	Organisation:	Benbow Environmental
	Address:	PO Box 687 Parramatta NSW 2124
	Contact:	Katie Trahair
	Sampling Site:	Not Known
	Telephone:	(02) 9890 5099
	Email:	ktrahair@benbowenviro.com.au
Project	ORLA Report Number:	5657A/ORLA/01
	Project Manager:	Peter Stephenson
	Testing operator:	Ali Naghizadeh
	ORLA Sample number(s):	4495 to 4498 inclusive
	SEMA Sample number(s):	725442 to 725445 inclusive
Order	Analysis Requested:	Odour Analysis
	Order requested by:	SEMA on behalf of Benbow Environmental
	Date of order:	27 April 2016
	Order number:	4561
	Telephone:	02 9737 9991
	Signed by:	Ali Naghizadeh
	Order accepted by:	Ali Naghizadeh
Report	Date of issue:	02 May 2016

NATA accredited laboratory number 15043.

Accredited for Compliance with ISO/IEC 17025.

Investigated Item	Odour concentration in odour units 'ou' determined by Sensory odour concentration measurements, of an odour sample supplied in a sampling bag. All samples were received in good condition.
Analysis Method	The samples were analysed in accordance with AS/NZS4323.3:2001.
Identification	The odour sample bags were labelled individually. Each label recorded the testing laboratory, sample number, sampling location (or Identification) sampling date and time, dilution ratio (if dilution was used) and whether further chemical analysis was required.
Method	The odour concentration measurements were performed using dynamic olfactometry according to the Australian Standard 'Determination of Odour Concentration by Dynamic Olfactometry AS/NZS4323.3:2001. The odour perception characteristics of the panel within the presentation series for the samples were analogous to that for n-butanol calibration. Any deviation from the Australian standard is recorded in the 'Comments' section of this report.
Instrument Used	The Olfactometer used during this testing session was: AC'SCENT International Olfactometer
Measuring Range	The measuring range of the AC'SCENT International olfactometer is $12 \leq \chi \leq 76{,}000$ ou. If the measuring range was insufficient the odour samples will have been pre-diluted.
Environment	The measurements were performed in an air- and odour-conditioned room. The room temperature is maintained between ± 3°C.
Measuring Dates	The date of each measurement is specified with the results.
Instrument Precision	The precision of this instrument (expressed as repeatability) for a sensory calibration must be $r \leq 0.05$ in accordance with the Australian Standard AS/NZS4323.3:2001. AC'SCENT International Olfactometer: $r = 0.0054$ (February 2016) Compliance – Yes
Instrumental Accuracy	The accuracy of this instrument for a sensory calibration must be $A \leq 0.20$ in accordance with the Australian Standard AS/NZS4323.3:2001. AC'SCENT International Olfactometer: $A = 0.027$ (February 2016) Compliance – Yes
Lower Detection Limit (LDL)	The LDL for the AC'SCENT International Olfactometer has been determined to be 12 ou
Traceability	The measurements have been performed using standards for which the traceability to the national standard has been demonstrated. The assessors are individually selected to comply with fixed criteria and are monitored every session to keep within the limits of the standard. The results from the assessors are traceable to primary standards of n-butanol in nitrogen.

02 May 2016



Peter Stephenson
Managing Director

Odour Research Laboratories Australia

Odour Olfactometry Results – 5657A/ORLA/01

Sample Location	Sample ID No.	Sampling Date & Time	ORLA Sample No.	Analysis Date & Time (Completed)	Panel Size	Valid ITEs	Sample Pre-Dilution	Sample Odour Concentration (ou) ^{1*}	Sample Odour Concentration (ou) ^{2*}	Odour Character & Hedonic Tone $^{\wedge +}$
Sample ID: 1A	725442	27-04-2016 09:42	4495	28-04-2016 10:30	4	8	Nil	180	180	Clay, mud, sweet, honey, chemical, vinyl, coconut, floral, paint, cleaning fluid, petrol (-1.3)$^{\wedge}$
Sample ID: 1B	725443	27-04-2016 09:49	4496	28-04-2016 11:00	4	8	Nil	270	270	Earthy, bread, kerosene, chemical, vinyl, floral, coconut, liquor, cleaning fluid, varnish, resin (-1.8)$^{\wedge}$
Sample ID: 2A	725444	27-04-2016 09:55	4497	28-04-2016 11:30	4	8	Nil	230	230	Sweet, yeasty, dusty, chemical, chemical burn-off, mangrove swamp, alcohol, floral, cleaning fluid, varnish, moth balls, disinfectant (-1.8)$^{\wedge}$
Sample ID: 2B	725445	27-04-2016 10:00	4498	28-04-2016 12:00	4	8	Nil	200	200	Chemical, sweet, dust, yeast, chemical burn-off, mangrove swamp, floral-chemical mix, cleaning fluid, varnish, musty, mouldy (-2.6)$^{\wedge}$

Odour Research Laboratories Australia

Odour Panel Calibration Results – 5657A/ORLA/01

Reference Odorant	ORLA Sample No.	Concentration of Reference Gas (ppm)	Reference Gas Measured Concentration (ou)	Panel Average Measured Concentration (ppb) [3]	Does this panel calibration measurement comply with AS/NZS4323.3:P2001 (Yes/No) [4]
n-butanol	4494	52	700	75	Yes

Comments: All samples were collected by Benbow Environmental and analysed by Odour Research Laboratories Australia at their Sydney Laboratory.

Notes from Odour Olfactometry Results:

[1] Sample Odour Concentration: as received in the bag

[2] Sample Odour Concentration: allowing for pre-dilution

[3] Panel Average Measured Concentration: indicates the sensitivity of the panel for the session completed

[4] Target Range for reference gas n-butanol is $20 \le \chi \le 80$ ppb and compliance with AS/NZ4323.3:2001 is based on the individuals rolling average and not on the panel average measured concentration. Panellist Rolling Average: PR = 54, GP = 64, TL = 52, PRA = 33

^ denotes the Average Hedonic Tone: describes the pleasantness of the odour being presented where (+5) represents Very Pleasant, (0) represents Neutral and (-5) represents Very Unpleasant and has been derived from the panellist responses at the recognition threshold.

+ This value is not part of our NATA Scope of Accreditation and AS4323.3

----------END OF TEST REPORT----------