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Austral Cardup Brickworks expansion development application Responses to Responsible Authority Report

1. Background

Austral Bricks (Austral) has submitted a Development Application to the Metro Outer Joint Development Assessment Panel (JDAP) on 29 November 2019 for an expansion of the Cardup Brickworks (DAP/19/01712). In its Responsible Authority Report, the Shire of Serpentine Jarrahdale recommended refusing the application on the basis that the potential impacts (of the proposal) had not been clearly demonstrated. Specific reasons for refusal were indicated as:

- 1. Insufficient information has been provided to adequately demonstrate that the proposal will not adversely impact the current and intended future amenity of the locality, specifically in respect of amenity impacts associated with dust and air emissions.*
- 2. Insufficient information has been provided to adequately demonstrate that the proposal will not adversely impact the environment, specifically being Cardup Brook, the associated riparian vegetation and the quality of groundwater.*
- 3. The subject land is designated to be zoned 'Rural' under the Council adopted proposed Local Planning Scheme No. 3. This represents a serious document likely to be adopted, to which regard must be given. The proposal represents a non-conforming use under the 'Rural' zone of the land in the new Scheme. While the new Scheme contains a provision at Clause 23(1)(a) that enables a merits based assessment to be performed to consider an extension of a non-conforming use, there is no precise manner of use intensity or extension prescribed in the new Scheme. Therefore, taking into account Reasons 1 and 2, an extension of a non-conforming use which this proposal would represent under the new Scheme, is not consistent with orderly and proper planning.*

Austral has asked Strategen-JBS&G to review the comments made by the Authorising Officer in the Responsible Authority Report in relation to Reason 1 (air quality impacts on amenity). This memo describes the findings from a review of those comments to support a submission from Austral to the Metro Outer JDAP.

2. Review of comments on air quality impacts

The relevant comments on air quality and related amenity matters have been extracted from the Responsible Authority Report (*Document 10.1.4 – attachment 1 of Ordinary Council Meeting minutes, 17 August 2020*) and summarised in Table 2.1. Responses to the comments are provided for each comment listed.

Table 2.1: Responses to air quality and related amenity comments in Responsible Authority Report

Responsible Authority Report reference	Authorising Officer comment/conclusion	Response
Officer recommendation: Item 1, Reason 1 (page 1)	Insufficient information has been provided to adequately demonstrate that the proposal will not adversely impact the current and intended future amenity of the locality, specifically in respect of amenity impacts associated with dust and air emissions	Adequate information has been presented to demonstrate that the maximum predicted concentrations and all averaging periods for gaseous pollutants are below the relevant air quality guideline values (AGVs), which are protective of both health and amenity (Strategen-JBS&G 2020).
Gaseous emissions (page 26, third paragraph)	The assessment uses meteorological data taken from the Bureau of Meteorology (BOM) between 2010 and 2014 from the Perth airport site, situated approximately 35km to the north. Officers, as part of the assessment, are not sufficiently confident in the use of meteorological data which from a site that is contextually different to the site in question. For example, a key influencing factor to the conditions of the area are the backdrop of the escarpment generating strong katabatic winds, and such winds are not noted as a feature common to the Perth Airport Site given its proximity away from the immediate rise of the escarpment.	Site-specific meteorological data were not available for the site. Prognostic models (such as TAPM) that can predict meteorological data for the site have been strongly criticised by the Department of Water and Environmental Regulation (DWER) as being unacceptable in the Perth region both in the scarp and along the coastal plain (DEC 2006). The scarp essentially runs parallel to the coast; as a consequence, there is alignment between the katabatic winds flowing up and down the scarp with the on/off-shore winds (i.e. the “Fremantle doctor”). This alignment in direction (up/down the scarp) and on/off-shore coincides with temperature changes which drive these strong winds. Therefore, there is temporal alignment in wind direction and changing wind speeds across the coastal plain both at the site and at the Perth Airport. While there may be minor discrepancies with the magnitude of the winds, it is incorrect to state that the winds at the two sites are contextually different. Furthermore, strong winds are indicative of better dispersion conditions and lower ground level concentrations and indicate conservatism in the assessment.
Gaseous emissions (page 26, fourth paragraph)	The assessment also uses AERMOD air quality dispersion modelling which has not been verified for use in WA in accordance with the DWER Air Emission Guideline, however the report identifies that it is widely used across America and throughout Australia	This is incorrect. DWER’s Air Emission Guideline (2019) does not describe requirements for verification of dispersion models for use in WA. The Guideline does reference the DWER Air Quality Modelling Guidance Notes (DoE 2006) in respect of its expectations for air quality dispersion modelling. It also notes that the 2006 modelling guidance is scheduled for review. Of note, in relation to models commonly utilised at the time that the 2006 guidance was issued, is a comment on the capability of AERMOD - in particular, “ <i>The USEPA-approved models AERMOD and CALPUFF have significantly improved scientific formulations and more advanced capabilities than AUSPLUME or ISCST3.</i> ” AERMOD is the approved regulatory model for the USEPA and has been adopted by most Australian states as their preferred model. It has been extensively validated in numerous studies to secure approval from the USEPA. Furthermore, DWER requires that model input and output data files be provided with modelling reports, such that DWER can verify the modelling has been conducted appropriately. Those data files have been provided in support of the application.

Responsible Authority Report reference	Authorising Officer comment/conclusion	Response
Gaseous emissions (page 26, fifth paragraph)	The assessment states that consideration has been given to the emissions from the brickworks under 'normal operations' however it is worth noting that no further information has been provided in relation to what the 'normal operations' entail. It is also noted that the scrubber can be bypassed if required due to fault or maintenance, which would result in different levels of emissions. The report does not consider the emissions in the scenario of the scrubber being bypassed, nor how potentially frequent this may occur	<p>Emissions from the brickworks are described in Table 3.1 of the modelling report. These represent emissions from normal operations, which are those operations which will produce 250,000 tpa of bricks. The processes involved in normal operations are detailed in Section 1.5 of the modelling report.</p> <p>The Authorising Officer appears to misunderstand the difference between the existing cascade scrubber and the proposed dry injection fabric filters (DIFF). The cascade scrubber must be bypassed for maintenance or to deal with failures or breakdowns. Under those conditions, the brick production push-rate is reduced to maintain HF emissions below 1 g/s as required by the DWER operating licence for the brickworks (Licence L9025/2017/1). The DIFF involves the addition of a dry reagent (lime) into the kiln exhaust gas stream, which mixes with the gas and then deposits on the surface of fabric filters. Acid gases react with the lime either in the flowing gas or on the surface of the filters, removing those gases from the exhaust gas as well as capturing the particulates (spent adsorbent).</p> <p>As described in the modelling report, the DIFF will have four compartments (chambers) that can be individually isolated for maintenance, leaving the rest of the unit in operation. The scrubber will not be bypassed, and emissions will continue to be scrubbed at those times. If a significant failure in the DIFF occurs, such as with the lime dosing system, then the push rate can be reduced to reduce acid gas emissions, until such time as the fault is rectified. The residual reagent in the gas stream and coated on the filters will continue to remove acid gases and provide low emissions outcomes.</p>
Gaseous emissions (page 26, last paragraph)	In terms of the reliability of systems, officers noted that the DWER Licence for the Austral site at Bellevue, made specific recommendations in relation to improvements required due to instances whereby abatement plant bypass has occurred. Officers would have a greater degree of confidence if modelling extended to consider the likelihood, magnitude and consequence of bypass events, given the similar technology being proposed was documented at the Bellevue site as having a high number of bypass events	The Bellevue plant requires bypass of the emissions control systems for essential maintenance, operational or safety reasons. The vast majority of bypass events are process control system generated, typically for temperature control purposes and are of short duration. The new technology provided by the proposed upgrade will include improved control systems that will minimise a requirement for bypass. However bypass is a safety feature required to protect the system. Further management actions take effect where situations may require safety bypass and Austral enacts its Bypass Management Procedure to ensure potential emissions do not exceed the licence limits.

Responsible Authority Report reference	Authorising Officer comment/conclusion	Response
Gaseous emissions (page 27, first paragraph)	Given the risk of amenity impact on nearby residential communities, and that a number of submissions also raise concerns on this risk, officers would be better informed by analysis to show what likely number of bypass events could occur, and what impact in respect of air emissions this may have	The most significant risk is provided by normal operations, which has been addressed in the modelling assessment. Bypass is not required.
Gaseous emissions (page 28, second paragraph)	Officers note that averaged data ranges are used in terms of depicting what may be the air emission amenity outcome. While Officers note that the table demonstrates compliance with air quality guideline value, expressed as a percentage, the use of an average of values may not show what could be the maximum impact, nor the likely magnitude (number) of such impact events	<p>The Authorising Officer appears to misunderstand the use of various averaging times for the respective pollutants. These averages reflect the various exposure scenarios for human health impacts and (for HF) impacts on vegetation. For example, a 1-hour average AGV of 140 $\mu\text{g}/\text{m}^3$ for HCl is determined from toxicological studies as a safe limit for acute impacts. In other words, a person can be exposed to HCl in the air at that concentration for an hour and not be expected to experience adverse health impacts.</p> <p>The maximum ground-level concentrations (GLCs) of pollutants in the modelling domain or at receptors represent the higher predicted GLC for the respective time averages. For example, the maximum 1-hour HCl GLC in the domain (103 $\mu\text{g}/\text{m}^3$) is the highest GLC for the 8,760 hours in the modelling year. All other GLCs for that pollutant are predicted to have lower concentrations. As such, this is the “maximum impact” as referred to by the Authorising Officer. The number of maximum GLCs is by definition one per modelling year.</p>
Gaseous emissions (page 28, second paragraph)	Also, in noting the reliance on meteorological data from a site distant from the Kiln Road location, and different in its weather conditions in terms of wind, creates further uncertainty as to this amenity issue.	See previous comments on meteorology. The airport data provides the most representative meteorological monitoring data for the site. The modelling has used five years of meteorological data and is showing that the predicted worst-case scenarios are below air quality guidelines.
Gaseous emissions (page 28, third paragraph)	Submissions raise concerns of emission impacts on amenity, and thus officers consider it important to be able to conclude with greater certainty on this point.	This information presented in Table 4.1 of the modelling report is conclusive in that predicted impacts are below guideline levels. Note that the AGVs used in the assessment are protective of both health and amenity.
Dust and gaseous emissions (page 28, fourth paragraph)	In respect of the assessment undertaken by Officers, the issue of dust and air emissions is not able to be conclusively determined at this specific stage, based on the level of information presented.	This level of information on gaseous air emissions conclusively demonstrates acceptable risk at sensitive receptors. In respect of dust emissions, the existing dust management practices, which are proven industry best practice, will continue to provide low dust risk outcomes. Emission estimating methodologies for fugitive dust emissions have been developed and validated as part of the National Pollution Inventory (NPI) program. Control measures as detailed in the DMP are included as part of the NPI emissions estimation, indicating the suitability of those measures.

3. Concluding remarks

The key air emission issues identified by the Authorising Officer in the Responsible Authority Report that can be summarised as:

- Normal operations are not described
- Inappropriate meteorology data and dispersion model used
- Absence of an assessment of fugitive dust emissions
- Scrubber bypass is not assessed
- Maximum impacts are not described
- Insufficient information is presented to provide adequate certainty in emissions impacts.

These issues have been addressed in the responses. Some misunderstandings are apparent in the Authorising Officer's comments in respect of scrubber operation and bypass, interpretation of dispersion model predictions and suitability of the model used for the assessment. These have also been addressed in the responses provided.

A handwritten signature in black ink, appearing to read "P. Forster".

Dr Peter Forster
Affiliate and Principal
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A handwritten signature in blue ink, appearing to read "M. Sowden".

Dr Miles Sowden
Modelling Specialist
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