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12 September 2023

The Assessment Manager
Brisbane City Council
266 George Street
Brisbane QLD 4000

Attention: Clifford Shoesmith – A/Principal Urban Planner
Delivery via email: Clifford.Shoesmith@brisbane.qld.gov.au

Dear Clifford,

RESPONSE TO OUTSTANDING MATTERS ADVICE FOR DEVELOPMENT APPLICATION AT 282 PARINGA RD MURARRIE QLD 4172 (COUNCIL REFERENCE: A006129295)

We write to you on behalf of *Incitec Pivot Limited* ('the Applicant'), in response to the 'outstanding matters' letter dated 21 August 2023 issued by Brisbane City Council in relation to the abovementioned development application (Council Ref.: A006129295).

This response is accompanied by, and should be read in conjunction with, the following supporting information:

- **Attachment A** – Environmental Noise Memorandum prepared by Aurecon;
- **Attachment B** – TCEQ Emission Calculations.

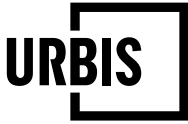
The outstanding matters noted in Council's abovementioned letter are provided in italics. Responses to each of these matters is provided further below.

NOISE

1. The updated noise reporting received 13 April 2023 has not addressed the information requested in the Information Request (dated 16 December 2022) as background noise monitoring at locations representative of the nearest sensitive uses and zones has not been undertaken and incorporated into the reporting. Provide updated reporting that incorporates the following detail:

a. Background noise monitoring is to be undertaken at locations which are representative of background noise levels experienced at the nearest sensitive uses/zones. The criteria of "RBL + 3dB" and "LAeq,9hr night + 5 or 10dB" are applicable at the residential zone and so the RBL and LAeq,9hr night to determine the criteria must be measured at or at a representative location of the nearest sensitive zone;

b. Explain why sound power level of existing plants have been derived from literature instead of actual measurements; and



c. Show ground-truthing or calibration of the noise model considering there is noise data of existing noise sources and noise measurements at/near the site boundary.

Response:

Please refer to the Environmental Noise Memorandum in **Attachment A** which outlines the context of acoustic emitters in the locality and the monitoring approach undertaken for the proposed development. This memorandum provides a full response to item 1. The approach documented within this memo has been discussed and agreed with Council's technical officers.

AIRQUALITY

2. The Air Quality Assessment Report prepared by Katestone (received 13 April 2023) has been reviewed and further information is required to demonstrate the development achieves the air quality benchmarks of the Industry code, as detailed below:

a. The emission factor used to determine NOx emissions from flaring is based on flaring of hydrocarbons and may not be appropriate to estimate emissions from flaring of other substances. Emission parameters (e.g. temperature, exit velocity, etc) may also be different for flaring of other substances due to differing conditions required for combustion. Provide justification as to why the emission rates and parameters used are suitable for the flaring of ammonia and H₂-N₂ gas mixture;

Response:

NO_x is produced through two mechanisms in a flare. One is thermal NO_x which converts nitrogen in the air into NO_x. The second is the conversion of nitrogen in the "fuel", in this case ammonia.

For the thermal based NO_x, standard factors were used from the US EPA reference, AP42 Chapter 13. This was considered an adequate source given the wide variety of other constituents that flares contain in industry.

For the fuel based NO_x, there are a range of sources that can be used to estimate the NO_x that would be produced. The best source will be the flare vendor however at this stage the flare vendor has not been selected.

Informed estimates such as a total of 2% by weight NO_x based on the incoming ammonia have been verbally communicated from personnel familiar with other projects.

Please refer to the attached paper by the Texas Commission on Environmental Quality (**Attachment B**) which indicates that fuel bound NO_x could be approximately 0.5% by weight of the incoming ammonia.

To be conservative, 10% was assumed in the calculations but in practice the actual value will be much lower.

A reputable flare vendor will be selected with extensive experience in the flaring of ammonia will be selected. They will provide the definitive data on the quantity of NO_x that will be produced.

b. Clarify whether or not it has been assumed that 100% of the ammonia that goes into the flare is combusted. Provide specifics about how the flare would be designed to maximise the combustion of ammonia and whether other gases would be required as input to assist flaring. Include in the model the emissions of uncombusted ammonia and combustion products of the other fuel gas, if applicable;

Response:

For modelling it has been assumed that 100% of the ammonia going to the flare is combusted. The flares are specifically designed to maximise combustion without the assistance of other gases.

While the flare itself has not yet been procured it will be sourced from a reputable flare provider with specific expertise in ammonia flares. When designing the flare, the provider takes into account the velocity and volume of gas going to the flare to maximise combustion.

Note that the nominated duration of operation of the ammonia tank-flare in the original air study report is once per year with an expected duration of 4 hours.

c. Provide justification for no modelling building downwash;

Response:

At the time of the air quality assessment, final building design on site had not been completed. The inclusion of building wakes will not affect the dispersion of the flare plumes due to the significant buoyancy of the plumes due to the high temperature and velocities.

Should the plumes of the other sources at the facility (denoted in Table 10 of the air quality assessment (Document reference D21119-15)) become entrained in buildings on site, this will likely lead to higher concentrations surrounding the buildings, which in turn will result in lower concentrations further afield. Given the distance between the facility and the receptor zones (860m to the south, 1,250m to the southeast, 1,500m to the east and 960m to the north) it is unlikely that the inclusion of building wakes will increase the concentrations of pollutants predicted at the receptor zones presented in the air quality assessment (Document reference D21119-15).

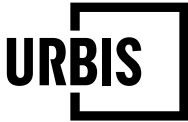
d. Clarify whether the gas to be flared in the ammonia plant flare consists of 75% H₂ and 25% N₂ only, and does not include ammonia; and

Response:

The air study modelling of the ammonia plant flare considered only H₂ and N₂ sources - known as the "syngas feed". This is a valid assumption for the most frequent flare events which normally occur during commissioning and startup of the ammonia plant.

Further detailed engineering has identified a very small number of specific plant failure scenarios where the plant flare will also combust ammonia. These flare scenarios will occur very rarely and last for only minutes in duration.

Similar to the design of the ammonia tank flare, the ammonia plant flare is designed to maximise combustion of this ammonia stream also. Based on the negligible frequency of the events this has not been considered in the air modelling.



e. Include the assessment of odour (e.g. from ammonia).

Response:

The odour threshold for ammonia ranges from 5ppm to 53 ppm (3,794 µg/m³ to 40,223 µg/m³) in accordance with established research (<https://www.ncbi.nlm.nih.gov/books/NBK207883>).

Therefore, 1 OU = 3,794 µg/m³ has been utilised to determine predicted 1-hour, 99.5th percentile concentrations of odour for normal operations.

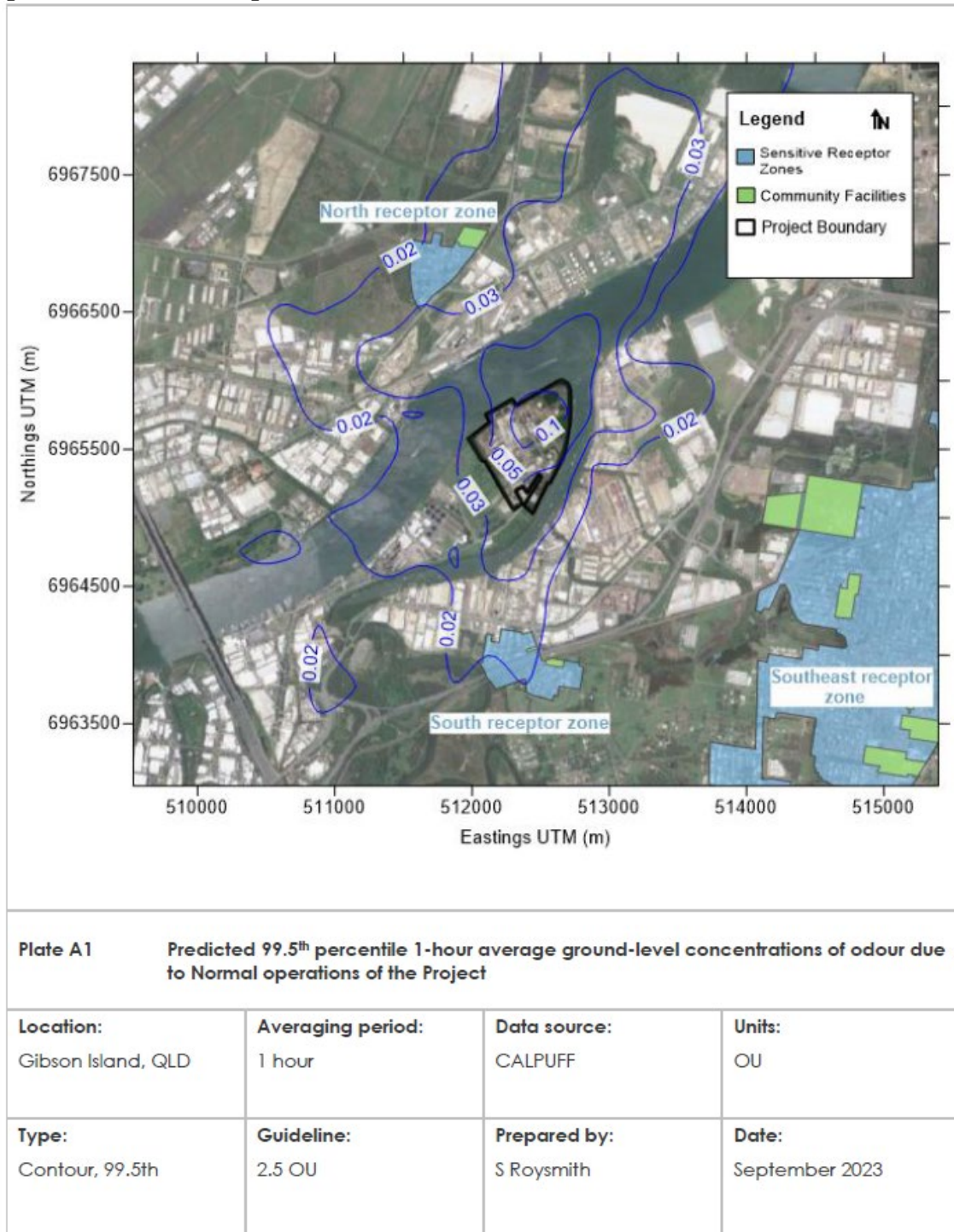
Tabulated results for the predicted 1-hour, 99.5th percentile concentrations of odour are presented in the table below and a contour is presented in **Figure 1** below. These results are well below the criteria permissible under Table 9.3.12.3.C.

Table 1 – Odour Results

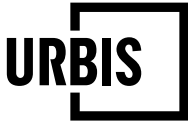
Receptor Zone	Odour (OU)
North	0.033
South	0.025
Southeast	0.020

Source: Incitec Pivot and Katestone Environmental

Figure 1 – Odour Modelling Results



Source: Katestone Environmental



AIRPORT ENVIRONS

The plume associated with the proposed development has potential to impact on air turbulence and operations of the Brisbane Airport. While correspondence from the Civil Aviation Safety Authority (CASA) was provided in response to the Information Request, further information is required to demonstrate the development does not impact on the safety and operation of the Brisbane Airport in accordance with the Airport environs overlay code and Part E of the State Planning Policy (Strategic Airports and Aviation Facilities). It is recommended the advice of Air Services Australia, CASA, and Brisbane Airport Corporation is sought to determine a proposed design and operational response that protects the safety and functioning of the operational airspace of Brisbane airport.

Response:

The Applicant notes Council's comments in relation to the aviation assessment for the development and the assessment benchmarks relevant to the matter. The project team have been liaising with the relevant technical agencies for the aviation assessment, including CASA, Air Services Australia, and the Brisbane Airport Corporation since the Information Request stage of the application. More detailed modelling and analysis of the potential plume rise of the development and likelihood of risk to aircraft is being undertaken by the project team.

Once further modelling and analysis of the potential plume rise has been completed, the project team will work with the relevant aviation authorities to reach agreement on the suitability of the development with respects to aviation safety.

Further updates in relation to this ongoing modelling and assessment will be provided in due course.

SUMMARY

This correspondence constitutes the total extent of the Applicant's response to Council's 'outstanding matters' letter dated 21 August 2023. We respectfully request that Council progresses with its assessment of the development application to the extent possible, noting the ongoing nature of the aviation assessment for the project.

If you have any questions regarding this material or wish to discuss the application further, please do not hesitate to contact the undersigned or Sam Robinson on +61 7 3007 3844.

Yours sincerely,

A handwritten signature in black ink, appearing to read "SB", with a long horizontal flourish extending to the right.

Steve Buhmann
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sbuhmann@urbis.com.au